













MÉMOIRES  
ET  
COMPTES RENDUS  
DE LA  
SOCIÉTÉ ROYALE  
DU  
CANADA  
POUR L'ANNÉE 1888.  
TOME VI.

MONTREAL :  
DAWSON FRÈRES, LIBRAIRES-ÉDITEURS.  
1889

PROCEEDINGS  
AND  
TRANSACTIONS  
OF THE  
ROYAL SOCIETY  
OF  
CANADA  
FOR THE YEAR 1888.

VOLUME VI.



MONTREAL:  
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# ROYAL SOCIETY OF CANADA.

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## PROCEEDINGS FOR 1888.

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### SEVENTH GENERAL MEETING, MAY, 1888.

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#### SESSION I. (*May 22nd.*)

The Royal Society of Canada held its seventh general meeting in the Railway Committee Room of the House of Commons at Ottawa, on Tuesday, May 22nd. The President, Prof. Lawson, took the chair at 11 o'clock, a. m., and formally called the meeting to order.

Dr. George Stewart was called upon to act as secretary in the temporary absence of Dr. Bourinot.

The minutes of the sixth general meeting, May, 1887, as printed in the fifth volume of the Transactions, were read and approved.

The Acting Secretary read the following

#### REPORT OF COUNCIL.

The Council of the Royal Society of Canada have the honour to submit their annual report:—

Vol. VI of the Transactions of the Society has recently appeared and is now in course of distribution. It contains over six hundred and fifty pages of printed matter and several illustrations, on the whole well executed. Much delay has occurred, as in the case of previous volumes, on account of the difficulty of obtaining the return of proofs and revises with a satisfactory degree of promptitude. It is needless, however, to observe that so large a volume, filled with many abstruse and scientific papers, requiring very exact revision, cannot be rapidly issued like ordinary books; and the publisher and printer can be congratulated on the excellence of their work and on their efforts to meet the wishes of the authors in every essential particular. At the same time the Council must impress on the authors of papers the difficulty of keeping a large amount of matter for months in type, and the necessity of assisting the printers by every means in their power. We submit the accounts of printing and publishing as audited by the Printing Committee.

MONTREAL, May 19th, 1888.

*The Royal Society of Canada.*

To Dawson Brothers, Dr.

For Balance from last account.....	\$1,444 57
“ Stationery.....	12 65
“ Postages, Proofs, etc. ....	21 15
“ Paper.....	1,370 25
“ Illustrations.....	424 92
“ Editing. ....	410 72
“ Cases, packing, shipping expenses.....	59 39
“ Foreign and domestic freight, express charges.....	170 92
“ Binding.....	517 50
“ “ extra copies.....	31 20
“ Composition.....	1,169 45
“ Press work.....	280 00
“ Insurance and storage, reserve copies.....	38 00
“ Alterations from copy.....	270 70
	<hr/>
	\$6,221 42
By Cash.....	\$ 700 00
“ “.....	588 13
“ “ Sales of volumes.....	34 50
“ “.....	2,000 00
“ “.....	300 00
“ “.....	1,100 00
	<hr/>
	4,722 63
	<hr/>
	\$ 1,498 79

A special copy of the Transactions of the Society was forwarded, as in previous years, through His Excellency the Governor-General, to Her Majesty the Queen, and its receipt has been duly acknowledged in the following letter which has been communicated to the Honorary Secretary:—

[Copy.]

SIR H. HOLLAND to LORD LANSDOWNE.

(Canada No. 8.)

DOWNING STREET,

January 7th, 1888.

MY LORD,

I received and laid before the Queen your despatch No. 444 of the 1st ultimo, transmitting for Her Majesty's acceptance a copy of Vol. IV of the Transactions of the Royal Society of Canada, and I am commanded to request that you will convey to the Society Her Majesty's best thanks for this volume.

I have, etc.,

(Signed)

H. T. HOLLAND.

Governor-General

*The Most Honourable**The MARQUIS OF LANSDOWNE, G. C. M. G., etc., etc., etc.*

We are happy to be able to state that the Government of Canada have placed this year in the regular estimates the amount of money which had been so generously contributed by Parliament towards the publication of the Transactions of the Society. This is so much evidence that the work of the Society is appreciated and that it must henceforth take a permanent place among the regularly established institutions of this country. The members of the Society should therefore recognise the necessity of continuing their efforts to add to the value of an institution which has been established under such favourable auspices and has such large opportunities before it for promoting the intellectual development of Canada, and making its material and scientific capabilities better known in other countries of the world.

The Honorary Secretary communicated to M. Alphonse LeRoy, Professor of Philosophy at the University of Liège, the fact that he had been unanimously elected Corresponding Member of the Royal Society. M. LeRoy has sent the following reply:—

LIÈGE, le 29 octobre 1887.

*A Monsieur J. G. BOURINOT, secrétaire honoraire de la Société Royale du Canada: —*

MONSIEUR, — Je reçois à l'instant même votre honorée lettre du 12 de ce mois, m'annonçant que la Société Royale du Canada, dans sa dernière séance, a bien voulu m'inscrire sur la liste de ses membres correspondants.

Je suis extrêmement flatté de cette marque de haute bienveillance; je me sens fier d'appartenir à un corps savant qui a pris rang, dès sa création, parmi les compagnies académiques les plus distinguées.

Vous me mandez que mon élection a eu lieu à *l'unanimité* des suffrages; ma dette de reconnaissance en est doublée. J'ose vous prier de vous faire, auprès de vos éminents confrères, l'interprète de mes sentiments.

J'ai bien peu de titres à une pareille faveur; le principal est le vif intérêt que je porte à votre noble patrie, aux vaillants promoteurs de la renaissance et de ses progrès dans tous les domaines.

Puisse-t-il m'être donné de justifier tant de confiance, en saisissant toutes les occasions de me rendre utile à la Société, peut-être même en prenant une part modeste à ses travaux.

En attendant, je vous adresse, Monsieur, avec l'expression de ma gratitude, l'hommage de ma plus haute considération et de mon dévouement bien sincère.

Votre très humble serviteur,

ALPHONSE LE ROY,

professeur de philosophie à l'université de Liège.

The Council have printed in English and French the Constitution and Rules in a convenient form for circulation among members and others interested in the work of the Society.

The Transactions continue to be sent regularly to the members of the Senate and House of Commons, governments, libraries and all public institutions of note in America and Europe. It is satisfactory to know from the requests that are constantly made for exchanges by the societies which have been overlooked in the annual distribution that the work of the Society is appreciated abroad and must sooner or later bear good fruit. The Society is in frequent receipt of gifts of works which are duly acknowledged by the Honorary Secretary. Amongst those recently received were two important works by Dr. T. Sterry Hunt on Mineral Physiology and Physiography, and a New Basis for Chemistry. The number of volumes and pamphlets which have accumulated in the course of years in the offices of the Secretary is now necessarily very large, and would be still larger if the Society had accommodation for a library for the use of its own members and all other persons engaged in scientific and historical investigations. The Council must again direct special attention to the

necessity of making some provision for the circulation of a large collection now useless for all practical purposes. The Society should carefully consider whether this collection should not be loaned to some public institution, which can keep a catalogue of the books and pamphlets and engage to return them whenever the Society is in a position to have a library of its own.

The Council are pleased to announce that the programme for the present session of the Royal Society contains a number of papers in each Section which promise to be of much value. The number of papers is as follows:—

- I.—French Literature, History, etc., 14.
- II.—English Literature, History, etc., 14.
- III.—Mathematical, Physical and Chemical Sciences, 10.
- IV.—Geological and Biological Sciences, 22.

The Council have to call attention to the neglect of the majority of the members of the Society to observe the rule which requires that “no paper shall be read in any Section at any general meeting of the Society unless it has been presented in full or in abstract at least three weeks before the day of meeting.” The object of this rule is to ensure the rapid and correct publication of a “programme containing the titles and abstracts of papers to be read before the Society,” which should be sent to the Society “at least one week before time of meeting.” For several years past, the Honorary Secretary has been able, only under the greatest difficulties, to publish a partial list of papers proposed to be read at the annual meetings. This year the difficulty was still greater in consequence of the dilatoriness of members in observing the rule. It must also be noticed that but few members have sent in abstracts, whilst in some cases very long abstracts have been so tardily forwarded that it has been impossible to publish them in time. The programme was late this year in appearing, and it was impossible to do more than issue an imperfect edition which had not, as in previous cases, undergone the revision of authors.

The usual invitations have been addressed to all the scientific and literary associations of Canada which have heretofore sent delegates to the annual meeting of the Royal Society, and we hope to be favored with the presence of a number of gentlemen who will be able to show the progress of literary and scientific studies in their particular centres of enquiry. It is important that these reports should be continued from year to year, and we would therefore earnestly call upon the societies affiliated with our own body not to fail in their duty, so that there may be a continuous review from year to year in the Transactions of the intellectual development of this country.

The Council consider it expedient to call attention to the relatively small attendance of members at the annual general meetings in May. At the last meeting there were only forty-six members present out of a total membership of eighty persons. It is hardly necessary to repeat what was said in the last report. There are many circumstances which naturally prevent a regular attendance. The Society is largely composed of gentlemen engaged in the work of education, in the geological and other branches of the public service, and it so happens that the time of the year chosen for the annual general meeting has not operated advantageously for the interests of the Society. When this Society was established by the Marquis of Lorne, its members naturally chose that season when they could have the advantage of the presence of their illustrious founder, and it has been the practice ever since to follow the precedent then made and to meet at the end of May. After an experience of six years, the Society must feel that it is worthy of consideration, whether a more convenient period cannot be chosen for calling the members together for general business and the reading of papers. The Council discussed this matter at a recent meeting, and it was thought inadvisable to make any change on their own responsibility, but to leave the matter for the deliberate consideration of the whole Society.

At the last annual meeting, a committee of the Council made, and the Society adopted, a report



on a proposal for an Imperial Union of Geological Surveys and Societies. The committee reported favorably on the object aimed at as of the greatest importance to the advancement of geological science. "It would appear," according to the report, "that the first steps towards such a union should be taken by scientific bodies in London, and that the Royal Society of London should be requested to begin the movement by inviting in the first instance to a conference, representatives of the Geological Survey of Great Britain and of the various societies and associations in Great Britain and Ireland prosecuting geological work, with representatives from similar bodies in the Colonies." The report of the committee was printed and circulated among all societies interested in the matter; but the Council understand that the Royal Society of London have so far declined to take the initiative in the matter, and consequently the Council have not been called upon to take any further action.

As the matter is one of great interest to the scientific world, the Council think it advisable to accept the recommendation of the committee as suggested in the following report:—

*Report of a Committee of the Royal Society of Canada on the subject of Geological Union.*

Your Committee beg leave to report that, immediately after the meeting of May last, copies of its last Report and of Sir William Dawson's letter to Prof. Stokes were printed and widely circulated in Great Britain and the Colonies, and a large number of letters in reply, most of them expressing approval and sympathy with the movement, were received.

A letter by the Chairman was also published in *Nature*, June 16th, 1887.

Communications were addressed to the Council of the British Association and to the President of the Geological Section, and the matter was discussed at the Manchester meeting, and noticed at some length in the address of the president of Section C. Unfortunately, however, none of the members of your Committee could be present at that meeting, and it is believed that, notwithstanding the explanations given in the printed documents, the objects in view were not clearly apprehended by many of the members.

Finally, the proposal to summon a conference under the auspices of the Royal Society was taken up by the Council of that Society at its meeting of October 27th, 1887, and the following resolution was passed:—

"That having regard to the existing condition of the question of Scientific Federation, and the various contingencies that may arise during the next few years, they do not see their way to summoning such a conference as that recommended."

This resolution seemed to preclude all immediate action, and since its receipt by the Chairman, nothing has been done, except in the way of private correspondence with persons interested in the subject. In view of the declinature of the Royal Society to move in the matter, and of the approaching meeting of the International Congress of Geologists in London, it appears best to leave the question, at present, in abeyance.

Your Committee, however, believe that the idea is a fruitful and important one, which may eventually prevail, that its suggestion and wide acceptance by scientific workers in Canada, Australia and other parts of the Empire cannot fail to lead to valuable results in the future, and that under certain contingencies it may be fully realized at no very distant date.

Your Committee would therefore recommend that it be continued, with the view of watching the course of events, and keeping up communication with those in different parts of the Empire who may be favourable to the object in view.

The whole respectfully submitted.

J. W. DAWSON.

The Council have to call attention to the following communication received from Bologna in Italy, in which the members of the Royal Society are requested to send a delegation to represent the Society at the approaching eight hundredth celebration of the university of that city in June next:—

*Ottavo Centenario dello Studio Bolognese.  
Sotto l'alto Protettorato di S. M. Umberto I. Re d'Italia.*

BOLOGNA, 12 Marzo 1888.

ILLMO SIGNORE,

Interesso la cortesia della S. V. Illma. di volermi con la massima sollecitudine significare i nomi, cognomi titoli accademici ed onorificenze dei Signori delegati a rappresentare l'Istituto scientifico, cui la S. V. Illma. meritamente presiede, nelle feste centenarie dello Studio Bolognese che si celebreranno nei giorni, 11, 12, 13, del prossimo Giugno.

Con distinta considerazione.

*Il Rettore,*

G. CAPELLINI.

Since last May, five vacancies have occurred in the four Sections of the Society, viz. :—

$$\text{Section} \left\{ \begin{array}{l} \text{I.—One} \\ \text{II.—One} \\ \text{III.—One} \\ \text{IV.—Two} \end{array} \right\} \text{vacancies.}$$

In accordance with Rule 6, as amended at the last meeting in May, the Honorary Secretary notified the members of each Section in which a vacancy had occurred, and transmitted to each of them a printed list of the candidates nominated, together with the reasons, in writing, for such nomination, at least four months before the present meeting of the Society.

No nomination was made for the vacancy in Section II; but a number of nominations were made for the other vacancies in accordance with the rule, and duly transmitted to each member of the Sections interested.

A meeting of the Council was held under the rule two months before the present annual meeting, and the votes counted.

The result of this meeting was announced in the following circular, addressed to the members of the Society in accordance with the rule which provides that, in case no candidate should receive two-thirds of the votes of the whole Section, "the Council may select one or more of the candidates obtaining the highest number of votes of the Section, and cause the members of the Society to be advised of the names of the candidates so selected, at least one month previous to the date of the annual meeting, when the election may take place by vote of the members present, or the matter be referred back to the Section concerned."

#### MEMORANDUM UNDER RULE 6 ADDRESSED TO THE MEMBERS OF THE SOCIETY.

The Council have to report that none of the candidates recommended to fill vacancies in Sections I, II, III and IV have received the requisite two-thirds vote.

Accordingly they now report :—

- (1) That Abbé Cuoq received eight votes, and they recommend that he be elected to fill the vacancy in Section I.

- (2) That Prof. Bovey received eleven and Dr. Ellis six votes; and they recommend the election of the former as obviously the choice of Section III.  
 (3) That there are two vacancies in Section IV.

Mr. A. H. MacKay received 8 votes.  
 Dr. T. Wesley Mills " 7 "  
 Abbé Provancher " 4 "

That if the "plumpers" cast were eliminated, the result would be—

Mr. MacKay..... 4 votes.  
 Dr. Mills ... . 4 "  
 Abbé Provancher ..... 3 "

In this case the Council simply report the facts, and make no special recommendation.

J. G. BOURINOT,  
*Hon. Sec.*

April 20th, 1888.

The Society are now called upon, on account of the failure of the Sections to elect, to make a choice of the names submitted to them by the Council.

As His Excellency the Marquis of Lansdowne is on the eve of departure from this country, where he has won such golden opinions from all classes of the people, the Royal Society are also called upon to add their expression of respect, and their thanks for the interest he has always taken in the progress and success of an institution which owes its origin to his distinguished predecessor. The Council submit herewith a draft of an address that is to be presented to His Excellency to-day:—

*To His Excellency the MARQUIS OF LANSDOWNE, &c., &c.*

MY LORD,—

The Royal Society of Canada, founded by your predecessor, the Marquis of Lorne, has the honour to number you among its members. Your Excellency is its Patron.

The functions of that Society are the pursuit of literature, French and English, scientific researches—all, in fact, that relates to life, discovery and history.

The results of its labours hitherto are embodied in the volumes which are in Your Excellency's library. In India or wherever else Your Excellency's lot may be cast, they will recall to you the pleasure and honour which you confer on us by reading them and the regret which we have experienced in seeing you leave our shores.

In taking leave of Your Excellency, the Fellows of the Royal Society, individually and collectively, wish, in the heartiest manner, to bid you and your gracious helpmate, Lady Lansdowne, a cordial godspeed to your new duties, as the representative of Our Queen, in the highest office to which a British subject may aspire.

In behalf of the Society.

#### LIST OF MEMBERS PRESENT.

The acting secretary called over the roll of members present, and the following gentlemen responded to their names:—

Abbé Casgrain, A. A. DeCelles, Faucher de Saint-Maurice, Dr. Fréchette, J. M. LeMoine, A. Lusignan, Joseph Marmette, B. Sulte, Abbé Tanguay, Dr. John George Bourinot, William Kirby, John Reade, Dr. George Stewart, C. Baillargé, C. Carpmael, E. Deville, Sandford Fleming, F. N. Gisborne, Very Rev. T. E. Hamel, G. C. Hoffmann, Dr. Johnson, T. Macfarlane, Prof. Bailey, Dr.

Robert Bell, Dr. T. J. Burgess, Dr. G. M. Dawson, Sir J. W. Dawson, Sir J. A. Grant, James Fletcher, Abbé J. C. K. Laflamme, Prof. Lawson, J. Macoun, W. Saunders, Dr. Selwyn, J. F. Whiteaves.

The Report of Council, and the recommendations contained therein, were then taken into consideration.

#### ADDRESS TO HIS EXCELLENCY THE GOVERNOR-GENERAL.

The draft of the address to His Excellency the Marquis of Lansdowne was formally adopted, and it was ordered to be presented by the President and Officers of the Society at such hour as might be considered most convenient to the Governor-General.

#### MISCELLANEOUS BUSINESS.

On the motion of Dr. Johnson, seconded by Mr. Carpmael, it was

“*Resolved*, that Dr. Lawson, Sir Wm. Dawson, Dr. Hamel, Dr. Bourinot and Mr. H. D. DeCelles be a committee to consider and report on any arrangements that can be made for the care and use by members of the books belonging to the Society.”

A motion made by Dr. Johnson and seconded by Dr. Selwyn, that the election of candidates be by open vote, was lost.

On motion of Mr. Macfarlane, seconded by Mr. Lusignan, it was

“*Resolved*, that the election of candidates be by ballot.”

Abbé Cuoq was then unanimously elected a member of Section I of the Society.

Prof. Bovey, M. A., was elected a member of Section III of the Society.

On motion of Dr. Johnson, seconded by Dr. Robert Bell, the question of electing two members to fill the vacancies in Section IV was referred back to this Section, with a request to report at this meeting.

#### REPORTS FROM AFFILIATED SOCIETIES.

The Acting Secretary then again read the list of Delegates, and the following Reports were submitted from the Affiliated Societies :—

I.—From *The Ottawa Literary and Scientific Society*, through Mr. H. B. SMALL :—

At the last meeting of the Royal Society, the President of the Ottawa Literary and Scientific Society for the current year was present as a delegate, and gave a verbal report of its progress and transactions, from April 1st, 1886, to March 31st, 1887, the Society's fiscal year.

By some oversight, however, a report in writing was not subsequently presented, and, consequently, no record was made in the Royal Society's Transactions. To remedy this deficiency, I have embodied in the report now submitted the result of the operations of that year, as well as those of the year 1887-8, ended March 31st last.

During the year 1886-7 Mr. W. P. Anderson was President, and at the annual meeting, terminating his tenure of office in March, 1887, the Ottawa Literary and Scientific Society was reported in a prosperous condition, there having been an increase in every item of revenue (the Provincial Government grant excepted). The library, containing 2,174 books, and the reading-room were well resorted to. Two valuable cases of insects were presented to the Museum by Dr. James Grant.

The following subjects constituted the course of lectures, and each of them was well attended, viz :—



1. Inaugural Address, by W. P. Anderson.
2. Empresses of the Salon, by Martin J. Griffin.
3. Concerning Bread, by Wm. Scott.
4. Native Plants used for Food, by James Fletcher, F.R.S.C.
5. Bells, by W. H. Kerr, M.A.
6. Lucretius, by W. D. LeSueur.
7. Vancouver Island, by G. M. Dawson.
8. Browning, by Rev. W. Herridge.
9. Tourguenieff, by J. H. Brown.
10. Styles in Poetry, by A. H. Lampman.
11. India and the Colonies in London, by Thomas Cross.

In addition to the above lectures, members of the Society were admitted free to a course of winter classes, held in the Society's rooms, on Geology, Botany and Entomology, organized by the Field Naturalists' Club.

The Society, feeling the great desirability for larger rooms, authorized their Executive Council to take initiative measures to procure a building of their own.

Mr. J. R. Armstrong was elected President for the next year.

1887-8.

During the year 1887, Mr. J. R. Armstrong filled the office of President, and the Society maintained its prosperous condition, with no outstanding liabilities for the year ending with his tenure of office. The library, containing 2,230 books, and the reading-room were, during the whole year, well attended. The desirability of making a considerable addition to the former was recommended at the annual meeting in March last, which proposal it is intended to carry out at once.

A course of lectures was provided for as follows, all of which commanded a good audience :—

- Inaugural Address, by H. B. Small.
- From Woden to Christ, by A. Spencer Jones.
- An Evening with Dickens, by J. F. Waters.
- Consolidation of the Empire, by T. Macfarlane, F.R.S.C.
- The English House of Commons as I knew it, by N. F. Davin, M.P.
- Byron, a character sketch, by J. F. Waters.
- Art and the Age, by F. A. Dixon.

In addition to the above lectures, a course of winter classes on Science, given by members of the Field Naturalists' Club, open to all members of the Literary and Scientific Society, was held in the Society's rooms.

No suitable building having been met with during the year, the Society has decided to retain its present quarters for two years longer, during which period, it is hoped, a scheme may be devised for erecting a building of its own, or that some suitable structure may be offered for purchase.

Mr. H. B. Small was elected President for the year now entered upon.

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II.—From *The Entomological Society of Ontario*, through Mr. H. H. LYMAN :—

As delegate from the Entomological Society of Ontario, I have much pleasure in submitting a concise report of its work and progress during the past year. The society, although nominally an Ontario institution, and largely supported by a liberal annual grant from that province, is composed of members distributed through the Dominion, besides having associate members throughout the United States as well as scattered all over the world. For the past fifteen years, a branch has been

maintained in Montreal, and though we have there suffered a severe blow during the past year in the death of our esteemed President, Mr. G. J. Bowles, an enthusiastic entomologist, and for several years a member of the editorial committee of the *Canadian Entomologist*, I have great hopes of our being able to keep the branch in active operation.

The monthly journal of the society, the *Canadian Entomologist* has been regularly issued during the past year, and still continues to hold its place as the leading magazine devoted exclusively to entomology published on this continent. It has completed its nineteenth volume and entered upon its twentieth. The former consists of 240 pages of reading matter, with one plate besides the index. The subject matter is fully up to the standard of former volumes, both in interest and importance. Three new genera and sixty-two new species were described in it and the contributors to its pages, amounting to thirty-seven in number, embrace a considerable proportion of the active and eminent entomologists of this continent as well as others of less note.

For a number of years past, one of the most important and valuable features of the *Entomologist* has been the very full description of the preparatory stages, or life-histories, of a considerable number of butterflies and some beetles, which have been contributed by entomologists eminent in their respective branches. These descriptions have been accumulating from year to year, and now amount to a very large number in comparison with the number of those whose early stages were known fifteen or twenty years ago.

The annual report of the society for the year 1887, has been somewhat delayed, not having yet been issued to the members, but it is expected to be distributed within a few days, and will, no doubt, be quite up to the high standard of the reports of previous years.

The very important collection of insects exhibited by the society, at the Colonial and Indian Exhibition, was duly returned to the society's headquarters at London, Ontario. Upon examination it was found, that some of the specimens had been badly damaged on the journey, as was naturally to be expected, and that many others had suffered very much from the long-continued exposure to the light at the Exhibition, as must inevitably occur under similar circumstances. The Society has accordingly issued a list of species required to place its collection again in perfect order, and though the list is large, many have already been received, and it is to be hoped that the remainder of the specimens needed, may be forthcoming from the members at no distant day.

The establishment in connection with the Department of Agriculture of the Central Experimental Farm, under the able direction of Mr. William Saunders, a former President of the Entomological Society, and the appointment to the position of Entomologist, in connection with the same, of so able and active an entomologist as Mr. James Fletcher, the present President of the Society, is likely to prove of vast importance to the country.

The active work which is now being carried on, will certainly prove of great benefit to the agriculturists of this country, not only by showing what crops it will be best to grow, but also how to preserve those crops from the destructive ravages of their tiny insect foes.

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### III.—From *The Literary and Historical Society of Quebec*, through Mr. WILLIAM WOOD:—

During the past year, the society has suffered from lack of funds. Owing to the withdrawal of the customary Government grant, the publication of valuable MSS. is, for the present, in abeyance. It is expected that the grant will be again obtained, when the Society will be enabled to fulfil, as in the past, one of its most important functions.

The membership is not so large as it ought to be; but we are in no worse plight than other societies of similar aims, and there are signs of some improvement. The library has been freely used, and many standard works of literature, history and science have been consulted; though the general reader's thirst for fiction is quite as great in Quebec as it is elsewhere.

A very active office-holder was lost to the Society by the death of Mr. Roderick McLeod, its

indefatigable librarian for years. More, perhaps, than most others, the Society felt the shock which went through the reading world, when the news of the death of Matthew Arnold arrived. The occasion of his lecture will long be remembered as a red-letter day in the Society's calendar. He had accepted, some years since, an honorary membership, thus honouring those who honoured him.

The lecture course of the past winter, has been very successful. There were nine lectures in all, five of which related exclusively to Canada, while the other four dealt with general topics. Thus, while rightly doing its utmost to foster a love for a special knowledge of Canada, the Society has not forgotten that it is also its duty to promote general culture so far as possible. Mr. F. C. Wurtele lectured on "Our Library;" Mr. J. M. LeMoine, F.R.S.C., on "Three Heroines of New France—Madame de Champlain, Madame de la Tour and Mademoiselle de Vercheres," and Mr. J. M. Harper, Ph. D., F.E.I.S. on "Champlain's Tomb." With these three lectures in English, are to be placed two delivered in French, one by M. Faucher de St. Maurice, M.P.P., F.R.S.C. on "Halifax, Cape Breton, Louisbourg, St. Pierre and Miquelon," the other by M. Napoléon Legendre on "Fréchette: the Canadian Poet." The four remaining lectures were "Popular Superstitions," by Mr. W. A. Ashe, F.R.A.S.; "The Briton in English History," by Mr. J. E. Prower; "Shakespeare: a study," by the Rev. Dr. Norman, M.A., D.C.L., and "Darwinism and Evolution, from a general reader's point of view," by Mr. William Wood.

At the Annual Meeting, held in January, the following gentlemen were elected to office for the current year:—

President.....	Geo. Stewart, jun., D.C.L., F.R.G.S., F.R.S.C.
Vice-Presidents .....	{ William Hossack. John Harper, Ph. D., F.E.I.S. Cyril Tessier. G. R. Renfrew.
Treasurer. ....	Edwin Pope.
Librarian.....	F. C. Wurtele.
Recording Secretary.....	J. E. Prower.
Corresponding Secretary.....	W. A. Ashe, F.R.A.S.
Council Secretary.....	A. Robertson.
Curator of Museum.....	W. Clint.
Curator of Apparatus.....	William Wood.
Additional Members of Council.....	{ J. M. LeMoine, F.R.S.C. P. Johnson. H. M. Price. Stanley Smith.

The meeting then adjourned for the purpose of giving an opportunity to members to meet in their respective Sections.

## SESSION II. (*May 23rd.*)

The members of the Society assembled at 10 o'clock, a.m., and the President called the meeting to order.

### MISCELLANEOUS BUSINESS.

The following resolutions were adopted:—

"*Resolved*, that the portion of the Report of Council referring to the appointment of a Committee to coöperate with the International Geological Congress at their meeting in London, be referred to

Section IV, for consideration, and that the Section in question should report, if possible, on the matter before the close of the present meeting." (On motion of Dr. G. M. Dawson, seconded by Dr. Selwyn.)

"*Resolved*, that the Council be requested to nominate delegates to attend the eight-hundredth anniversary of the foundation of the University of Bologna, and also to acknowledge with thanks the receipt of the invitation." (On motion of Dr. Johnson, seconded by Dr. G. Stewart.)

"*Resolved*, that a committee consisting of Dr. Bourinot, Mr. Fleming, Mr. Lusignan, Mr. Macfarlane and Dr. Dawson be appointed to collect the opinions of all the members of the Society as to the most convenient time for the annual general meeting, and to report thereon to the Council." (On motion of Dr. Johnson, seconded by Prof. Macoun.)

#### GOVERNOR-GENERAL'S REPLY TO ADDRESS.

The President reported that the deputation appointed by the Society had waited upon His Excellency the Governor-General, who had graciously received the address, and made the following reply:—

MR. PRESIDENT AND GENTLEMEN:—I thank you for the kind terms in which you have taken leave of me for the last time, and for the good wishes which you have expressed towards Lady Lansdowne and myself. I appreciate the attention which you have paid me in coming here this morning, all the more, because it has unfortunately been the case that I have been prevented from giving as much practical evidence as I should have wished of the interest which I have felt in the affairs of the Royal Society. I am sure that you will not attribute my too frequent absence from your annual meetings to indifference on my part, and that you will understand, that if I was not present when you were in Session, it was simply for the reason that my engagements in other parts of the Dominion placed it out of my power to meet you. The loss has in any case been my own, and I have often regretted it.

I am glad before leaving Canada to have the opportunity of expressing my appreciation of the services which the Royal Society has been able to render to this country, both in respect of the actual literary and scientific work which it has performed, and also by creating a most useful bond of union between literary and scientific men connected with different sections of the Dominion.

I can assure you that I feel proud of having filled the position of Patron of a Society such as yours, and that the goodwill which you have been kind enough to express as its official representatives is most precious to me.

I shall preserve, as a valuable memento of the Society, the handsome volumes in which are recorded its Transactions, since the date of its foundation by my predecessor. The six years, the labours of which are summed up in those volumes, form a past to which you are able to appeal with satisfaction. For the future you need, I think, have no uneasiness as to what it has in store for you.

The Society is based upon foundations which appear to me to be of the utmost stability, and I have no doubt, if it continues to be supported by the intellectual energy of both races, if it continues to perform faithfully the functions entrusted to it—functions which you have so correctly described in your address,—that it will play in the history of the Dominion a part of which the usefulness and importance will continually increase.

Permit me to add that the interest which I shall take in the Royal Society will not end with my departure from this country, and to express the hope that you, gentlemen, will, even after I have left your shores, be pleased to count me as one of yourselves.

REPORTS FROM AFFILIATED SOCIETIES (*Continued.*)

The Societies which had not hitherto reported, presented the following Reports:—

IV.—From *The Hamilton Association for the Promotion of Literature, Science and Art*, through Mr. ADAM BROWN, M.P.:—

Throughout the past year, the work of this Association has been vigorously carried on, and the interest fully maintained. There is now an enrolled membership of 145. During the session u closed, eight general meetings were held, at which the following papers were read and discussed:—

1. Evolution, by the President, Rev. Samuel Lyle, B.D.
2. The Mahabarata, by H. B. Witton.
3. Notes on the Waverley Novels, by Rev. C. H. Mockridge, D.D.
4. Notes on Primitive Man, by Wm. Kennedy.
5. Atmospheric Pressure, by Alex. Gaviller.
6. The Paston Letters, by H. B. Witton.
7. How best to study Botany, by T. J. W. Burgess, M.B.

Besides these general meetings, the various sections of the Association held regular meetings, and did a considerable amount of original work. In the Biological Section, which comprises botany, ornithology and entomology, a great impetus was given to the pursuit of the study of the first of these sciences, by the connection of Dr. Burgess, one of the members of your honorable Society, with the Association. His knowledge of, and enthusiasm in, the science has impelled many of our members to take up this branch. In Entomology, another of our members, Mr. J. Alston Moffat, who is a member of the Council of the Entomological Society of Ontario, has taken a leading part, and has, among other contributions, handed in a list of 145 Canadian Lepidoptera, with notes on the same, which he has added to the Canadian fauna during the period of his collecting. The subject of ornithology is well represented in Mr. Thomas McIlwraith, who is Chairman of the Section. His "Birds of Ontario," published in our last volume of Proceedings, as well as papers contributed by him during the past year, show that this branch of biological study is not lost sight of.

The Section meets on the first and third Fridays of each month, when one or more papers of a thoroughly practical, and largely original character are read and discussed. The members also report any observations made by them since the previous meeting.

The following papers, most of which were illustrated by specimens, were read during the past session:—

1. A Biography of the only known Carniverous Larva of a Butterfly: the habits of *Fenesica Tarquinius*, by J. Alston Moffat.
2. Orchids: Description of the general and local Species, with specimens of the Canadian Species, by T. J. W. Burgess, M.B.
3. Economic Ornithology: a paper dealing principally with the English Sparrow, its productive-ness and destructiveness, by Thos. McIlwraith.
4. The Arboreal Habits of some of our Native Snakes, by J. Alston Moffat.
5. Field-notes of a Winter Holiday Trip to Aikin, South Carolina, in January 1888, by T. W. Reynolds, M.D.
6. Color in Flowers and Plants, and Insect Fertilization, by A. Alexander.
7. Notes on the History of Botany, by T. J. W. Burgess, M.B.
8. Circulation of the Sap in Trees. (Discussion.)
9. The Mystery in the life-history of *Danaïs Archippus*: An account of the Formation and Migration of flocks of the common Milk-weed Butterfly, by J. Alston Moffat.

10. Fertilization of Plants by Insects. (Discussion.)

11. Notes on Birds of Paradise, by Thos. McIlwraith and T. W. Reynolds, M.D.

12. Notes on the Flora of the 49th Parallel from the Lake of the Woods to the Rocky Mountains: Observations made while serving as Surgeon in Her Majesty's British North American Boundary Commission, by T. J. W. Burgess, M.B.

13. Notes on Birds seen during the Winter of 1887-8, by Thos. McIlwraith.

14. Some Inquiries about the Inception of the young of the Marsupials, by J. Alston Moffat.

As an outcome of the paper on Economic Ornithology, which was afterwards read before the Fruit Growers' Association and published in the *Farmers' Advocate*, a committee has been formed by the Fruit Growers' Association to secure the necessary legislation to restrict the increase of the English Sparrow.

This paper will be included in the volume of Proceedings now in course of publication by the Association.

The Biological Section purposes holding Weekly Field Meetings during the summer, and a Monthly Meeting in the Library and Museum to examine specimens and compare notes on field work, etc.

At the Annual Meeting, the following were elected the executive for the ensuing year:—

President.....	Rev. Samuel Lyle, B.D.
Vice-Presidents.....	{ T. J. W. Burgess, M.B. W. A. Child, Ph. D.
Recording Secretary.....	A. Alexander, F.S.Sc., London, England.
Corresponding Secretary.....	H. B. Witton, B.A.
Treasurer.....	Richard Bull.
Curator and Librarian.....	Alex. Gaviller.
Council .....	{ J. Alston Moffat. S. J. Ireland. B. E. Charlton. Wm. Kennedy. T. W. Reynolds, M.D.

V.—From *The Natural Society of Montreal*, through Mr. A. T. DRUMMOND:—

During the past year the Society has held seven regular meetings for the reading and discussion of papers. These papers have included the following:—

1. The meeting of the American Association for the Advancement of Science for 1887, by Dr. T. Wesley Mills.

2. The Prairies of Manitoba, by A. T. Drummond.

3. The Physical and Past Geological Relations of British North American Plants, by A. T. Drummond.

4. Notes on new Fossil Sponges from the Quebec group at Metis, by Sir Wm. Dawson.

5. Examination of some Manitoba Waters, by A. McGill.

6. On the classification of the Cambrian Rocks in Acadia, by G. F. Matthew.

7. Fossils from the Utica Shale at Murray Bay, by H. M. Ami.

8. Some of the Birds and Mammals of the Hudson Bay Territories and Arctic coast, by Dr. John Rae.

9. Chicago Boulder Clay, by Dr. Anderson.

The *Canadian Record of Science* continues to be published quarterly under the auspices of the

Society. Besides including the Proceedings of the Society and the papers contributed by the members and read before it, the *Record* has published a number of original articles from the pens of others. Some of these articles are of great scientific value. In all, twenty-two original papers have appeared.

The endeavour of the Editing Committee of the *Record* has been to publish the magazine with regularity. It now claims to be the only periodical in the Dominion devoted to science thus regularly issued, and whose columns are open to contributions from scientific men at large. It continues to be circulated gratuitously amongst local and foreign educational and scientific societies and institutions.

The Sommerville course of lectures has this year been greatly appreciated. The subject chosen by the Lecture Committee for illustration was "Climate," and the large attendance at each lecture proved the great interest which was shown by the public. The wisdom of endowments of this nature for supplying the most recent scientific information in a popular form was amply verified. The course this year comprised the following lectures:—

1. Climate in Geological Time, by Sir Wm. Dawson.
2. Climate : the Present Atmospheric Conditions of the Globe, by Prof. McLeod.
3. Climate in relation to Vegetation, by Prof. Penhallow.
4. Weather Probabilities, by Prof. C. Carpmæl.
5. The Climate of the Canadian West, by Ernest Ingersoll.
6. Climate in relation to Health, by Dr. T. G. Roddick.

The annual field day has always been looked on by the Society, not only as an opportunity for its members to meet and work together in the field, but also as a means of popularising science among the many others who join in these annual excursions. Very many most interesting localities within a radius of sixty miles from Montreal have thus been visited, and explored by the Society, and the extreme courtesy of the leading railways has added greatly to the pleasure which has been afforded its members on these occasions. The field day of the past season, which was no exception to the usual success that attends these gatherings, was held at St. Jerome.

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VI.—From *The Numismatic and Antiquarian Society of Montreal*, through Mr. R. W. McLACHLAN:—

In availing themselves of the provisions afforded by the constitution of the Royal Society to thus make public a synopsis of its proceedings, the members of the Numismatic and Antiquarian Society report with pleasure considerable progress during the year.—

In December last the Society celebrated its twenty-fifth anniversary. This took the form of a Canadian Historical Portrait Exhibition, opened by His Excellency the Governor-General. Knowing that there was scattered throughout the country a wealth of old portraits of those who were the makers of Canadian History, the members of the Society set to work, and the result of their efforts proved far beyond their expectations. Had there been more means and space at their disposal much more could have been accomplished. As it was over two hundred portraits in oil (some of which were rescued from the rubbish heap) besides many water-colors and prints, were shown. Combined with this exhibition was a display of *bric à brac* mainly of such objects as related to the history and early settlement of the country. Altogether the celebration was a complete success, although, as is usual in such cases, its financial features bore rather heavily on the members. I have the honor to present your Society with a copy of the catalogue of portraits, compiled for the occasion, also with a medal struck in commemoration of the Twenty-fifth Anniversary which bears a portrait of the President of the Society, the Hon. Justice Baby. This medal is pronounced by *connoisseurs* to be specimen of high art after the style of the celebrated medallists of the early Italian Renaissance.

At the April meeting of the Society a resolution was passed, recommending that the two hundred and fiftieth anniversary of the city should be celebrated by an International Exhibition. The idea has been readily taken hold of by the public, and it seems likely to be consummated by the holding of



such a celebration in Montreal in 1892. This will bring the history, enterprise and resources of Canada into greater prominence, and show forth her capacity to the world.

During the year, on account of greater activity in other directions, few papers have been read; but the study of our antiquities, and of the currency and medals has been quietly continued. The results of this study will be given to the public in more tangible form in the course of the next few years. The papers are as follows:—

1. Champlain, by Henry Mott.
2. The Deerfield Massacre, by Miss C. A. Baker.
3. Canadian Communion Tokens, by R. W. McLachlan.

More interest is now manifested in the Society's chosen subjects by many of our countrymen, from among these a number have joined the ranks of the Society. We have also been enabled to make arrangements for the continuing of the issue of the *Canadian Antiquarian*, which has been in abeyance for over a year on account of the failure of arrangements with the publishers.

It is hoped that the Royal Society may long continue to encourage generally the study of Canadian Historical subjects.

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VII.—From the *Society for Historical Studies of Montreal*, through Mr. W. J. WHITE.

On behalf of the Society for Historical Studies of Montreal, I have the honor to submit the following report:—

The last report to your Society referred to a series of papers comprising a complete chronological review of the History of Canada, which was read during the last session. The last of these was read on June 1st, 1887, and dealt with the period from 1815 to 1837. For the session now ending a programme of special subjects was prepared and has been carried out as follows:—

1887. Nov. 2nd, Champlain, by Mr. Henry Mott.

“ 16th, Catherine Tehgakwita, by Mr. John Lesperance.

Sir William Alexander, by Mr. W. W. L. Chipman.

Nov. 30th, the Early Interpreters, by Mr. John Reade.

Dec. 14th, Sir Hovenden Walker, by Mr. A. W. Smith.

A Note on the Settlement of St. Regis, by Mr. W. J. White.

Dec. 28th, the Last of the Mohicans, by Mr. John Lesperance.

Slavery in Canada, by Mr. Henry Mott.

1888. Jan. 11th, the Massacre at Fort George, by Mr. George Falconer.

Feb. 1st, a Critique of Mr. Sellar's History of the County of Huntingdon, by Mr. W. D. Lighthall.

Trial by Jury, by Mr. W. J. White.

Feb. 22nd, Governor Murray 1760-63, by Mr. John Lesperance.

Washington and DeJumonville, by Mr. Charles Holt.

Mar. 7th, the Settlement of the U. E. Loyalists, by Mr. W. D. Lighthall.

Geographical Names of Canada (Part I) by Mr. Gerald E. Hart.

Mar. 28th, Rev. W. S. Barnes at the invitation of the Society, read a valuable paper on Count Rumford.

April 11th, the Trial and Execution of McLane for Treason, by Mr. Henry Mott.

“ 25th, the Eau-de-Vie Controversy, by Mr. John Reade.

Haldimand and Ducalvet, by Mr. Wm. McLennan.

A number of rare books have from time to time been exhibited, and a few additions have been made to the Society's library. It is proposed to devote special attention to the formation of the

library in the coming season, and the establishment of an annual competition for a gold medal is also contemplated. Thirteen resident members have been elected during the year, and we now trust that the success of the Society is assured.

In conclusion we would draw attention to the publication of Mr. Gerald E. Hart's Essay on the Fall of New France, which was mentioned in our last report as having been read before the Society. We are glad to know that this book by the President reflects credit on the Society, and indicates an increasing interest in Canadian history, which it is gratifying to think that we have had some slight part in producing. It is hoped that other similar publications will follow.

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### SESSION III. (*Public Meeting.*)

In pursuance of notice, a public meeting was held in the Railway Committee room, on the evening of the 23rd, at 8 o'clock.

The President, Prof. Lawson, took the chair, and then delivered the following address:—

FELLOWS OF THE ROYAL SOCIETY, LADIES AND GENTLEMEN:—My first duty on this occasion is to express to you, my fellow members, the grateful acknowledgment and thanks which I owe for the honour you have bestowed in placing me in the high position of President of the Royal Society of Canada, an office whose character will be sufficiently shown by the mere mention of the names of those whom you selected to fill it in former years: Sir William Dawson, Dr. Chauveau, Dr. Sterry Hunt, Dr. Daniel Wilson, Monsignor Hamel. It would be difficult to select five other names of living men more intimately associated with the intellectual, educational and industrial development of Canada, engraven in clearer lines in the records of our literature and science, or more deeply impressed upon the hearts of those classes of our people who are most thoughtful, intelligent and enterprising. I might well, then, shrink from taking this chair and attempting to discharge the duties that pertain to it. If I had thought that your selection was made solely on the ground of my personal fitness, or as an acknowledgment of work done or expected to be done in my individual capacity, I should have hesitated to assent to your choice, or to attempt the task which acceptance involved. But the considerations that led to my acquiescence were of a different kind. I felt that we were working together for the success of this Society not as an end in itself, but as a means, an organization, whereby we might be enabled, in some measure, to contribute our part in accomplishing the country's good, by promoting literary and scientific research and discovery, educational improvement, industrial development and general intellectual activity throughout this Dominion; that, as fellows of this Society, we were charged with this work, and each bound to take cheerfully the part that might be allotted to him; that we were here, moreover, not only in our individual capacities, for what we might do with our own hands, but also as the representatives of other active laborers in the several departments of knowledge scattered through the various provinces; and that once a year we might, one and all, come to the common meeting place, not merely to give account of the results reached by our personal efforts, in the way of trying to push forward the boundaries of the known, or to clear the way for discoveries by others, but also to bring in our hands the offerings of co-workers, our associates, in our respective districts, or in our special subjects of research. For these reasons I was led to regard your choice of a president from the extreme eastern part of our long and wide country as a choice deliberately made, in pursuance of a wise and safe policy, often referred to in our deliberations, that aims not only at recognizing every department of literature and science, and every form of intellectual activity, but also as offering, to the fullest possible extent, fair representation and encouragement to every province and every part of the Dominion. I trust that this policy, and the principle upon which it is based, will long continue to guide the deliberations of the members and Council of this Society in the selection of officers, so far as compatible with efficiency, as well as the action of the several Sections in the nomination of members.

These remarks naturally suggest a fact of another kind, viz., that a large amount of the executive business during the year, when the Society is not in session, and when it is inconvenient for distant members of Council to attend, has necessarily to be performed by a small number of those who reside within convenient distances of Ottawa or Montreal; responsibilities and labor thus devolve upon the few that should otherwise be spread over the many. This is especially the case in regard to the publication of our Proceedings and Transactions, which necessarily involves a serious amount of irksome labor. If we, the distant members, cannot lighten it in any way, it may be permissible to say that, while not insensible of the unavoidable disadvantages which limit our participation in the Society's operations in many ways, we yet have but one feeling in regard to the laborious and thoroughly efficient and satisfactory manner in which, through many difficulties, the work of publication has been carried on. We are grateful for this to our active members in Montreal and Ottawa, whose painstaking efforts to make the researches of others presentable to the public are apt to be overlooked, and especially to our active Secretary, who is styled *honorary*, on the sound principle, I presume, that the greater the labor the greater the honour. We have also the comforting assurance, expressed in many tangible ways, and not as a mere sentiment, that by seeking to maintain the activity of the distant provinces, the Society has the surest guarantee against the tendency to centralization which seemed to some of us from the first to menace it, and the best prospect of success in carrying out its aim of permanent usefulness to the whole Dominion.

We first assembled as a Society in the Railway Committee room in the Parliament buildings, on May 25th, 1882, and have come together annually since then, so that we have now entered upon our seventh year's work. The record of the preceding six years is contained in our five volumes of Proceedings and Transactions, a perusal of which enables us to ascertain to what extent the objects set before us are being accomplished.

From the nature of our organization, which necessitates our being divided off into distinct Sections, which assemble in separate rooms, we are apt individually to be but imperfectly cognizant of the full extent of work that is being actually accomplished by the Society as a whole. If it be so among ourselves, how much more is a paucity or total absence of knowledge of what we are doing likely to prevail among those who are merely onlookers. When we are here assembled together, the members of all Sections, and favored by the presence of friends who manifest an interest in our proceedings, I do not know that the hour can be spent more profitably than by adverting to some of the work of the members during the past year, now completed by the publication of the fifth volume of Transactions.

Before proceeding to do so, there are some matters relating to our organization, and to the operations of the Society as a whole, that claim attention. A few changes have taken place in our membership during the year: one, in the second Section, by the resignation of Mr. Charles Sangster, and another by the retirement of Mr. Charles Lindsay. In the third Section we lost, by the death of Dr. Herbert A. Bayne, at a comparatively early age, a member who gave much promise of usefulness. There were likewise two retirements in the fourth Section, Messrs. J. M. Jones and D. N. St. Cyr. One of the vacancies in the second Section was filled, in accordance with the recommendation of the section, by election to fellowship of John Charles Dent, author of "The Last Forty Years: Canada since the Union of 1841," and other literary works. The other vacancy still remains. The number of the third Section has been completed by the election of Mr. Henry T. Bovey, the active Secretary of the Canadian Institute of Civil Engineers, and a contributor to our Transactions. For the two vacancies in the fourth Section, candidates have been nominated, and the Society will be called to elect before our adjournment. Professor Alphonse Le Roy, of the University of Liege, and member of the Royal Academy of Belgium, has been added to our still short list of corresponding members.

As our organization is of a limited membership, composed of twenty fellows in each of the four Sections, giving a total of eighty, it is essential that all should be active workers. The Council have

accordingly thought it expedient to call attention again to the rule which sets forth that: "Any member failing to attend three years in succession, without presenting a paper, or assigning reasons in writing satisfactory to the Society, shall be considered to have resigned." Last year there were forty-three fellows in actual attendance, that is, exclusive of those who, although not present, sent papers. There were likewise twenty delegates from affiliated societies, and eighteen reports from them have been printed in our Proceedings. At this early stage, the attendance at our present annual meeting is not yet complete, but bids fair to equal or exceed that of previous years, both in the number of fellows and of delegates from associated societies.

The report of the Council, read to-day, calls our attention to the rapidly accumulating stores of exchange books, and other publications, that are being daily brought by the mails from those literary and scientific societies throughout the world with which we are in correspondence. These treasures are already of sufficient extent to form the nucleus of a reference library, but there is as yet no suitable house accommodation for them, nor central premises where the Society's executive work can be conveniently carried on. The supply of this want cannot be longer deferred. The matter might be considered one of detail for the Council, but it is necessary to bear in mind that the Council require something more than a mere formal approval of their report, where the action necessary to carry it out involves a permanent expenditure of funds not as yet placed at their disposal. It is hoped that, before the adjournment of this annual meeting, arrangements will have been made to secure the requisite accommodation, and to have a catalogue of the Society's library prepared and printed. Members will recollect that one part of our work, as originally outlined, was the formation, in the literary Sections, of a reading committee, whose duty it would be to report upon the publications of the year.

The next point in the Council's report is not only of scientific interest, but of practical importance to us as a commercial and travelling people. Regret is expressed that the Government has not yet found itself in a position to recommend to Parliament a grant for the establishment of a regular system of observations of tides and currents in the waters of the Dominion. Members will recollect that concerted action was taken by the Society, in conjunction with the British Association for the Advancement of Science, whose annual meeting was held in Montreal in August, 1884. Committees were appointed. Memorials were presented to the Privy Council and the Parliament of Canada, and various means have been subsequently adopted to create an interest in the subject. It is obvious that the information sought would be of substantial value, not to Canada alone, but to every shipping community, and is called for in the interests of humanity as well as of commerce, as we are so frequently reminded by recurring wrecks at many points on our shores. The subject is one that will necessarily continue to occupy the Society's attention until some practical result has been reached; it cannot be supposed that a matter of so much importance will be long overlooked by a Government alive to the interests of the whole Dominion.

The subject of the proposed "scientific federation of the Empire," was brought before the Council by a copy submitted of a letter addressed by Sir William Dawson to Professor Stokes, President of the Royal Society. It related especially to the aspect of the matter with reference to geological science, as likely to lend itself to such an union more readily than some other departments. The proceedings of the International Congress meeting had suggested serious difficulties in the way of general agreement as to geological classification, nomenclature and mapping, but these depended largely on differences of language and of habits of thought, and would not affect an union of geologists of the British Empire, and ultimately of all English-speaking countries. Such an union might be undertaken in the first instance, and with the view, not of obstructing, but of aiding the wider movement. An union of British and English-speaking geologists might overcome the difficulties which appear so formidable as between the different European nations, and might lay a broad foundation which would ultimately be adopted by other countries, so far as local diversities and differences of language might permit. The geological union would naturally be followed by similar coöperation in other departments of natural science. The Council at once appointed a Committee to

take the matter into consideration, and report to the Society. In their report, the Committee refer to the object as one of the greatest importance to geological science; they point out the steps that might be taken toward its accomplishment by scientific bodies, beginning with the Royal Society of London, the aid that might be given by the Geological Survey of the Dominion, and the coöperation of this Society, and of those affiliated with it that are engaged in the prosecution of geological work. Our fourth Section expressed, by resolution, its concurrence in the report and its willingness to aid in any measure taken towards an imperial geological union. The report was adopted by the Society in general session, and the necessary powers were given to the Council to act upon it. The whole subject, including that of international relations, will be again before the Society and the Section more directly concerned, during the present week's meetings.

In turning to the work of the Sections during the year, as shown in our new (fifth) volume of Transactions, we find that forty-five papers have been printed out of seventy that were read. Many were no doubt retained by the authors for the purpose of being further elaborated or perfected by additional work, a course often suggested by the discussions that follow the reading of papers in the Sections. Although our publications are not to be valued by their mere number, or the space they occupy, yet it was thought well to call attention, a year ago, to the threatened preponderance—not unlooked for—of papers in the fourth Section, Geological and Biological Sciences, over those of other Sections and especially the French and English Sections of Literature and History. In our new volume, this discrepancy has well nigh disappeared, for, of papers in French Literature and History we have eleven, more than double the number of the previous year, emulating indeed the fertile composite Section of Biology and Geology in bulk of space. In our present year's programme there is a further increase to fourteen French literary papers and eleven English ones, so that apparently the contributions of English literature have doubled, and of the French trebled, in the course of two years. On the other hand, the difficulty of reaching perfection in literary production, where progressive sciences are being dealt with, is illustrated by the fact that, of forty papers submitted and read at our last year's meeting, in the Section for Geology and Biology, only twenty-one reached the printer's hands.

As if in deference to the artistic fitness of giving precedence to elegance and beauty, our first Section is devoted to the French Language, Literature and History, and is regarded more than any other as the repository for productions of a purely literary character. We have not forgotten the anticipation so happily expressed by our Patron when we first entered upon our labours. In placing before us the objects aimed at in this institution, the Marquis of Lorne told us that "in one division our fellow-countrymen, descended from the stock of Old France, would discuss, with that grace of diction and appreciation of talent which are so conspicuous among them, all that might affect their literature and the maintenance of the purity of that grand language from which the English is largely derived." Has not the work of the Section been a sustained realization of that prediction? From the first day's meeting, May 25th, 1882, when Messrs. LeMoine and Faucher de Saint Maurice delivered their presidential addresses, we have had from that Section a succession of compositions in poetry and prose, prepared with the greatest care, by such of our fellow members and others as Messrs. Chauveau, Marchand, Sulte, Le May, Frechette, De Cazes, Legendre, Tremblay, De Celles—need I extend the list?—whilst researches of the most painstaking kind have been undertaken in regard to our earliest Canadian history by Abbé Verreau, Abbé Tanguay, M. Beaudry, and others, leading us back to the very beginnings of European life in Canada, to the original families, the individuals who laid the first foundations of civilization in the country, and to whom the present generation proudly trace back their lineage. In these records, which are being made available to our historians, we have precise, accurate materials for history such as few countries possess, and such as any country may be justly proud of.

The early history of European life in Canada is not a simple record of peaceful settlement, undisturbed industry, and merited repose. The storms encountered by the first voyagers in crossing the

ocean, the wearisome toils of forest-clearing and farm-making of the first settlers, soon gave place to the exciting warfare of human strife. Papers in previous volumes of our Transactions have elucidated and illustrated several phases of the disturbed state of society in early times. In the present one we have an elaborate paper of seventy-seven pages by Abbé Casgrain relating to a point in our history that has peculiar interest, and has of late years excited much popular attention—the fate of the people familiarly known as the Acadians, the early French inhabitants who had established villages in the imperfectly defined tract then known as “Acadie,” and now embraced by Nova Scotia and a large part of New Brunswick. The cause and policy that led to the expulsion and dispersion of these unfortunate people, as well as the circumstances attending their removal from the country, do not appear even now, after the lapse of a hundred and thirty years, to be by any means exhausted subjects for the historian, or to have lost interest for the general public. Abbé Casgrain’s present paper, which contains a large amount of information, brought together in a painstaking manner, with the necessary references to what has been already published on points referred to, and quotations from original documents, will be acceptable at once to the general reader, and to the student who desires to make further research. As Sir Adams Archibald well observes, the event occurred at a time of restlessness among the nations, and the warlike operations which for years engaged the great armies in Europe, as well as the stirring events that were being enacted on this side the Atlantic, obscured for the time the removal of the Acadians. When the facts became known, a feeling of pity arose for the expatriated people, and of reprobation for what seemed to be an act of merciless severity. Haliburton feelingly related the touching narrative, and Longfellow, interested in it, ascertained from Hawthorne that one of the Acadian girls who had been separated from her lover, passed her life waiting and seeking for him, only to find him at last dying in a hospital when both were old. Longfellow worked up the facts into a poetical picture of highest art, a tale of love in Acadie, home of the happy. Thus was flashed upon the world of humanity, ever sympathetic to the tale of suffering and wrong, the wonderfully beautiful story of “Evangeline.” The Acadian people were presented as the heroes of one of the most touching episodes in history. Their old home of Grand Pré, and the fruitful valley that once knew them, stretching away in broad expanse to Blomidon, were invested by the poet with a halo of interest that brings tourists annually to wander over the hallowed ground. The present dwellers in the district also love to cherish the old traditions, and to perpetuate the poet’s personifications in the names of their favourite cattle and domestic pets, to emblazon them on locomotives that pass through the Evangeline land, and to send them on the prows of their ships to furthest climes. Poetry and word-painting are not history; in this case they proved effective promoters of its study, for the facts involved, that had been so long neglected, became matter of historical enquiry. Diversity of opinion prevails as to the interpretation of the facts. But papers like those of Abbé Casgrain, and of Sir Adams Archibald in the publication of one of our associated societies, furnish the material necessary for obtaining correct views. That considerations and sympathies tending to warp our judgments should enter into such matters is inevitable. It is sometimes said that a good way of allaying party feelings, and healing up differences, is to forget and forgive, but this is merely a palliative measure, acceptable for the time to the man of affairs, the man of the world. The historian’s method is the more excellent way, whereby, in a case like this, the adornments of fancy are stripped off, and the actual facts brought into view; the use of the scalpel in laying bare the bones, until we have nothing left but a disarticulated skeleton of facts, may seem a heartless process, but, as followers of scientific method, we are bound to follow it. Let our historians go on, then, with their researches to a final issue, feeling that this is a subject that specially comes within cognizance of our Society, composed as it is of compatriots representing the two races, using the two languages, and all bound together by a singleness of purpose to search for and promote the cause of truth.

There are other literary compositions and historical papers of interest and importance in our French Section. Of those that belong to the former class, we have M. Rémi Tremblay’s “In forma

pauperis," presented by M. Lusignan, with its quaint touches that serve to lighten up the underlying argument, an appeal on behalf of literature. M. Napoléon Legendre's "La cloche," "La fileuse," "La noce au village," commend themselves to us, not only as works of literary art, but as affording picturesque and pleasing illustration of traits in our Canadian history and glimpses of the social life and habits of our French people. Then, we have the graceful and elegant poem, "Hosanna," by M. Pamphile Le May, "Hommage à Sa Très Gracieuse Majesté Victoria, reine d'Angleterre et impératrice des Indes." Messrs. Paul de Cazes and Legendre discuss freely, in separate papers, the subject of the French Language as used in Canada, its degree of purity, corruptions, and tendencies to change. Both of these papers are written in a terse and practical form so as to be useful in an educational sense, while they are also not only intelligible to philologists, but of interest to all who care to observe the mutations of living language, the causes that originate, and the influences that control them. There is no room for fear that the French language will be allowed either to die out or degenerate for want of cultivation in a country where it is spoken of with such fervour as in one of these papers: "Pour moi, je me suis imposé un devoir, je me suis assigné une tâche que je remplirai dans la mesure de mes moyens: c'est de défendre, toujours, partout, contre tous, la langue de mon pays, la langue de ma mère patrie; c'est de travailler de toutes mes forces à répandre, à faire connaître, à faire aimer, dans toute sa glorieuse beauté, la langue dans laquelle des voix chères m'ont accueilli à mon berceau, la langue qui a chanté les rêves de ma jeunesse, la langue qui me consolera, je l'espère, à mes derniers moments!"

M. A. D. De Celles, in his paper "La crise du régime parlementaire," marshals before us an array of facts in the political history of England and the nations of Europe during the last two hundred years, in such a way as to reconcile us with the actual condition of our own Dominion, and to lead us to hope that our rulers will continue to be guided by the spirit of the words of Bossuet, which he quotes: "La vraie fin de la politique est de rendre la vie commode et le peuple heureux."

The strictly historical papers, in addition to Abbé Casgrain's already referred to, are M. P. J. U. Beaudry's account of the old French fort now known as Crown Point, on Lake Champlain, containing useful materials for history in careful selections from official records of family events and transactions of various kinds, made at the time, from the year 1732 to 1760, and Abbé Verreau's contribution, "Des commencements de Montréal" (1635), which furnishes a chapter in early history that reads with interest in the light of subsequent events, and of the importance, as a centre of commerce and civilization, of the city of Montreal.

In the second Section, English Literature and History, Mr. John Lesperance gives a paper on the Analytical Study of Canadian History. He points out that the period during which the practical study of Canadian history has engaged our attention does not go back beyond thirty years, that as an instance of the law of parallels research brought material to light, and the discovery of material gave new impulse to research. The existence of material was not unknown, but its use was not demanded. He argues for the teaching of Canadian history as a specialty in one or more of our universities, appeals to patriotic citizens to provide the necessary chairs, gives a scheme of lectures that would no doubt form an interesting and useful course, and suggests special studies, episodes and problems, involving original research in points in dispute, or that have been imperfectly investigated, and for which prizes might be offered.

We have a detail of the earliest and historically most important exploration of our coasts, in fact pre-Canadian, in a paper communicated by Dr. Stewart, the Secretary of the Section, viz., Mr. Ganong's critical account, with illustrated chart, of the circumstances attending Cartier's first voyage to Canada in the year 1534. Although not the first navigator to enter the Gulf of St. Lawrence, Jacques Cartier was the first to leave an account of his explorations or observations on the Indian tribes of the region. The special purpose of this paper is to trace with more exactness certain parts of the course respecting which the several versions of the original narrative differ, and to identify more clearly the numerous places visited and described by the early voyagers, few of the place-names



originally given having survived. Those engaged in historical or geographical work will know how to value a practical contribution such as this.

Sir Adams Archibald explains and illustrates an episode in coast history that brings us two centuries nearer to our own time, in his account of the first siege and capture of the great French fortress of Louisbourg, Cape Breton, in 1745; it contains full and circumstantial details of the many remarkable circumstances connected with that event, and points out its influence in shaping the fortune of North America.

That there is a charge upon us to give heed to literature and history beyond those pertaining to European settlement and civilization, we are reminded by several papers in this Section. First, we have Mr. John Reade's paper, entitled "Some Wabanaki Songs." The people called Wabanaki comprise Micmacs of Nova Scotia, Prince Edward Island and New Brunswick, the Abenakis of St. Francis, and the Penobscot and Passamaquoddy Indians of Maine. It appears that these songs are no wise connected, either in substance or style, with the traditions of the Northmen, and are equally independent, for their simple and touching beauty, of the influences of French or English settlers. Mr. Reade follows this paper with one on the general subject of Aboriginal American poetry, treating it in a scientific form, in relation to (1) Mr. Herbert Spencer's "developing man," (2) Signor Vignoli's theory of the stages in man's spiritual development in its bearing on the origin of poetry among rude tribes (Prof. Posnet tracing all literature back to choral songs of war and peace), as well as on its cultivation by more advanced races.

Dr. Franz Boas, who has already made valuable contributions to our knowledge of the poetry and music of North American Indian tribes, from information gained through intimate intercourse with the aborigines, contributes a sketch of the mythology and traditions of the Central Eskimo, whose legends and myths are numerous, from facts collected during his stay in Baffin Land in the years 1883 and 1884. From the facts so far as ascertained, concludes that the more ancient forms of customs and traditions are found west of Baffin Bay, that the Eskimo migrated by way of Baffin Land to Greenland and Labrador, and that the lake region west of Hudson Bay was the early home of the Eskimo; but their ethnology needs further study.

Mr. Lucien Turner, of the Smithsonian Institution, Washington, sends us, through Dr. Robert Bell, a paper on the native inhabitants of the Ungava District, Labrador—composed of Indians and Eskimo—two peoples widely separated in speech and customs. The personal characteristics, food, dwellings, habits, social relations, customs and superstitions are given, with a few examples of folklore, interesting stories that form reading quite as entertaining and artistic as much that rivets the attention of railway travellers, and forms a large bulk of popular literature. Information is given respecting the several peoples, and the nature of the respective districts inhabited by them.

Dr. George Dawson contributes notes and observations on the Kwakwiool people, that is, people speaking the Kwakwiool language, of the northern part of Vancouver Island and adjacent coasts, made during the summer of 1885; he adds a vocabulary of about seven hundred words. Such contributions are of special value in view of the facts that these west coast tribes, together with their ideas and their lore, are passing away before our eyes; or, where they still show evidence of continued vitality, they are losing their old beliefs and ways. Whilst engaged in his geological examinations of the northern part of Vancouver Island and its vicinity, Dr. Dawson was in intimate association with the people, and now gives, from his observations and notes, an interesting account of their mode of life and habits of thought, their territory and tribal subdivisions, their arts, customs, traditions, superstitions, folklore and religion, and of their actual social condition. He also suggests means, that may, with prospect of success, be adopted for the improvement of these people, who do not appreciate moral maxims, and whose mental state does not enable them to rightly understand religious dogma. The problem of their elevation is fundamentally an industrial one; they are willing to work, and industries established among them, giving employment, would prevent their drifting to the larger settlements and towns.

It will be seen that the exceptionally great opportunities presented to us for the collection of ethnological facts at the present time, when new country is being explored, and the advance of European settlement is displacing the aboriginal inhabitants, or disturbing their primitive modes of life and thought, are being availed of by our members and correspondents. At present we cannot fully realize the value for future use of such information, obtained by competent observers, from actual observation and contact with these native races.

In the third Section, Mathematical, Physical and Chemical Sciences, Mr. Macfarlane, the President of the Section, devoted his Address chiefly to what must be regarded as the great triumph of modern chemistry in its industrial aspect, one that has contributed to the world's wealth to an extent far beyond what is generally known—the Utilization of Waste. The history of chemical technology for the last thirty years is essentially the history of the utilization of waste materials in chemical manufactures, mechanical processes and the ordinary operations of civilized life. Mr. Macfarlane illustrates the results of efforts in this direction by striking facts, such as the desolation caused by the Freiberg smelting works, which at first destroyed the crops and forests around; when the blighting clouds were condensed and manufactured into sulphuric acid, glass, metals, and metallic salts, the verdant fields and forests were brought back again, and the noxious waste converted into a source of profit. So, the recovery of combined nitrogen from the waste gases of the iron works of the Clyde is another example on a great scale. The elimination of phosphorus from iron and steel by means of a basic slag, has not only improved the qualities and cheapened the price—thus extending the usefulness of these materials so essential to our civilization—but the waste slags, which now contain the phosphorus, are found applicable to agricultural use, the material so injurious to the iron and steel being to the soil a valuable fertilizer. The bye products of the soda manufacture, the recovery of copper from pyrites, of manganic oxide used in the production of chlorine, the condensation of hydrochloric acid, and many others are widely known. The wood pulp manufacture is an example of the conversion to economic use of a long neglected raw material found abundantly all over our country. But the gigantic waste of the Dominion, as of other civilized countries, is that pertaining to the branch of industry in which by far the largest number of our people are engaged, viz., agriculture. Every pound of any fertilizer applied to a soil that does not require it, or requires something else to make it effective, is so much waste, and science has striven to show how such waste may be avoided. There is the waste still running on, on many farms, of neglecting to secure the pound of nitrogen, worth sixteen cents, by the expenditure of a penny for plaster; and there is the waste to the country at large, as yet in only a few cases economized, of enormous quantities of plant-food phosphates, combined nitrogen, and potash salts—carried out of our towns and cities by their sewers. In regard to the feeding elements of the fodder supplied to live stock, more attention is given to the results obtained by scientific experiment, for the marked differences in profit and loss depending upon them bring an immediate pressure that is felt by the practical farmer. It is but a step from scientific cattle-feeding to the suggestion offered that the human species is not unworthy of attention in this regard; that, in fact, experiments and experience in regard to human nutrition have led to the growth of a new science, previously a neglected spray of physiology. The waste to be utilized in this case is not of mere matter, but human energy, health, comfort and happiness.

The work necessary for the exact determination of the chemical composition of our native mineral products, while it involves patient and tedious manipulation, is often of a kind that does not arrest attention, unless the substance involved is likely to yield immediately profitable results. It is of the greatest importance to science, however, to secure such substantial permanent additions to knowledge as Mr. G. Christian Hoffman's description and elaborate analyses of the specimens of Canadian Native Platinum, sent from Granite Creek by Mr. Elwyn, Deputy Provincial Secretary of British Columbia. Besides Platinum, the ore yielded, both its non-magnetic and magnetic portions, Palladium, Rhodium, Iridium, Copper, Iron, (Osmium being absent); in the non-magnetic portion there was a percentage of 16.62, in the magnetic of 10.51, of Osmiridium.

Our public system of Analysis of Foods has now been in operation for a number of years, and the work done by our official analysts is being more fully appreciated by the public at large, as its real nature and objects become more generally known, and as the system itself becomes recognized as a means conducive to public health and comfort, and of securing honesty in commercial transactions. The methods by which the determinations are made—the processes of analysis, as they are called—are being improved and systematized from time to time, and their degrees of accuracy experimentally ascertained. Where the results of scientific investigations are liable to form the basis of proceedings before civil or criminal courts, or are needed to supply the evidence for the prosecution of judicial enquiries, it is obvious that two conditions are very desirable, if not in all cases absolutely necessary: (1) that the methods of investigation should be such as to yield results of known accuracy, with definitely ascertained limits of error; (2) that these methods, and the manner in which the results are obtained, should be capable of clear and simple explanation, intelligible to judges, juries and the public, as well as to experts, so far as necessary to enable their exact probatory value to be understood. Such considerations prepare us for appreciating the importance of the careful testing and comparing of processes that are being constantly pursued in the laboratories of our public analysts. The paper of Mr. Anthony McGill, gives some idea of the elaborate nature of the investigations needful for obtaining tests sufficiently precise even to enable the analyst to reach a satisfactory conclusion in regard to what may seem to many to be a very simple matter, the purity of our morning cup of coffee. Mr. Macfarlane and Mr. Ellis follow this up with accounts of methods of Milk Analysis, and then comes Dr. Ruttan's paper on the Digestibility of certain varieties of Bread, an experimental study of what has long been known to experts as "the alum question." Those who have watched the history of the adulteration of articles of food and drink since the days when Dr. Hassall first aroused the people of England to its enormity, some forty years ago, will know how much attention has been given to this one special subject of the use of alum in bread, the effect of alum being, it is alleged, to produce an apparently pure loaf from defective flour. It appears from Dr. Ruttan's researches that the decomposition of both phosphate and alum baking powders results in the formation of salts which decidedly retard the action of the digestive ferments; that the alum salts produced are of greater retarding power than the phosphates, and that both exercise a marked retardation over tartaric acid. These results remind us of the employment of certain tartarates in medicine, and of the beneficial effects experienced from the use of fruits and vegetables containing acid tartarates. As ingredients in bread, resulting from the use of baking powders, alkaline sulphates and phosphate of alumina are regarded as most injurious.

The Flow of the Sap is a phenomenon that engaged the attention of vegetable physiologists at a time when the knowledge of plant structures and functions was but imperfect. Other questions arising withdrew attention from it, and left experimental work still to be done. Dr. Harrington's paper will again call attention to this subject. He gives a series of tabulated experiments on the flow of the saccharine sap of the ash-leaved maple, made on two trees growing not far from McGill College, Montreal, showing the season of sap-flow, and the effects of temperature, etc., upon it, from day to day.

Mr. A. P. Coleman's paper on the Microscopic Petrography of the Drift of Central Ontario appeals to the geologist on behalf of a form of investigation that may have been too much neglected, and indicates scope for still more extended observation.

Mr. Bovey, the active Secretary of the Canadian Institute of Civil Engineers, has communicated, through Dr. Johnson, the results of an investigation as to the Maximum Bending Moments at the Points of Support of continuous Girders of  $n$  Spans. Mr. Bovey's name having been subsequently added to our membership, we may confidently hope that this important paper will be followed by the results of other mathematical and physical researches tending to practical utility, so important in a country like ours actively engaged in works of construction.

The fourth Section, Geological and Biological Sciences, is opened by Abbé Laflamme's

biographical study of Dr. Michel Sarrazin, a contribution towards the history of science in Canada in the early part of the eighteenth century. To many the name of Sarrazin has hitherto been known only as having furnished the generic term *Sarracenia* to the curious and well known pitcher plant of our swamps. The renowned French botanist Tournefort, who did so much, in his "Institutiones Rei Herbariae," to establish plant genera, before the time of Linnæus, dedicated this genus to his friend, Dr. Sarrazin, of Quebec, and the present paper, prepared with such evident care, and from the only existing authentic records, will be appreciated by men of science in general, as well as by the medical profession in Canada, of which Dr. Sarrazin was not only a very early but also a very eminent member.

The geological papers bear testimony as usual, by their number and importance, to the abundance of work that is being done in this department of research. We have, indeed, in the able and ever active staff of the Geological Survey of Canada, under direction of Dr. Selwyn, assurance of a perennial growth of geological knowledge, apart from the valuable contributions that are annually made by those of our members who are not connected with the Survey. Mr. Gilpin, Government Inspector of Mines of Nova Scotia, gives an account of the Faults and Foldings of one of our Nova Scotian Coal Fields, that of Pictou, which, though comparatively limited in extent, being now but a fragment eight miles long and three wide, yet exhibits, on an unusual scale, three of the great features of geology: a development of large seams of coal, a system of immense faults, an equal measure of denudation.

Sir William Dawson, whose prolonged and eminently successful researches in regard to our fossil floras have made the subject peculiarly his own, gives notes on Fossil Woods and other plant remains from the Cretaceous and Laramie formations of the western territories of Canada. The paper is the result of examinations of slices of about sixty distinct trees, most of them *in situ*, from the horizons of the Belly River, Fort Pierre and Laramie groups, and forms another valuable contribution to our knowledge of fossil plants.

Prof. Bailey gives his notes on the Physiography and Geology of Aroostook County, Maine, in connection with regions of New Brunswick and Quebec with which he had previously compared it. He records a number of valuable observations that will be appreciated by geologists, and, in addition to the positive results obtained, shows what is, in a scientific point of view, second in importance only to actual discovery, viz., what work there is still room for in Northern Maine.

Mr. Peter McKellar's paper on the Correlation of the Animikie and Huronian rocks of Lake Superior, communicated by Dr. Bell, deals with a subject that has received the attention of geologists at different times, and was referred to in the address of the President in opening the proceedings of the Section for the present session.

Dr. Franz Boas, whose account of the mythology and traditions of the Central Eskimo has been already referred to, in connection with the work of the second Section, describes, from his explorations made in 1883 and 1884, the Geography and Geology of Baffin Land, the large island forming the west shore of Davis Strait and Baffin Bay, separated from the American continent by the narrow Fury and Hecla Strait and by Hudson Strait, and forming the north-eastern boundary of the Hudson Bay basin. Its area cannot be less than 215,000 square miles. Its plains are occupied by two large lakes, the surplus water of which, received during the warm season, is sufficient to feed their outlet throughout the winter. Several interesting phenomena (peculiar to northern shores) are illustrated: the action of breakers in changing the outlines of the coast is prevented in ice-bound seas; land-ice attached to the coast does not form where strong currents exist; in arctic regions, where the surface is covered with ice, erosion is very limited, while the rocks are rapidly disintegrated by the process of freezing.

Mr. Lucien M. Turner, in like manner, describes the physical and geological character of another tract, the Ungava District, Labrador, which is contained by the waters of Hudson Bay on the west, of Hudson Strait on the north, by the western slope of the Labrador coast range on the east, and by the height of land, about 54° N. lat. on the south. Mr. Turner's description does not show it to be a

land of much promise. Fully three-fourths of the area is bare rock, mainly Laurentian. Disintegration is a noticeable feature of the higher altitudes, while the lower and older rocks are polished by glacial action of apparently so recent an age that their smooth surfaces indicate but the faintest traces of weathering. The climate is severe, the vegetation dwarfed.

Ice action is more specially taken up in the two papers communicated by Dr. Bell, from Prof. Spencer, formerly of King's College. The first is on Glacial Erosion in Norway and in High Latitudes, and gives an account of Dr. Spencer's visit in 1886 to the three largest snowfields in Norway (one with an area of 580 square miles), all of which send down glaciers to within 50 to 1,200 feet of the sea. After giving a series of interesting descriptions and observations, Dr. Spencer arrives at the conclusion that the potency of land-glaciers to act as great eroding agents is not only not proven, but most strongly negatived, whilst the work of floating or sea ice is in some forms enormous, its erosive power depending upon its moving with a velocity never acquired by glaciers. The second paper, on the Theory of Glacial Motion, deals specially with Prof. J. D. Forbes's theory, which excited much discussion forty years ago, that: "A glacier is an imperfect fluid or viscous body which is urged down slopes of a certain inclination by mutual pressure of its parts," as Forbes illustrated simply by a barrel of pitch, with its end out, lying in the sun. Prof. Spencer, after a full consideration of facts and arguments, favours this old fluidity theory as the most acceptable explanation of the motion of glaciers.

The Petroleum Field of Canada has engaged the pen of Dr. Bell, President of the Section, who gives its interesting history, describing it as situated near the south-western extremity of the province of Ontario, and on rocks of Devonian age overlaid by a considerable thickness of drift. The gum-beds are located in wet clayey land in the townships, adjoining each other, of Enniskillen and Down, where the drift clay is from seventy to eighty-five feet thick. An essential condition of the retention of the petroleum is that the natural subterranean reservoir must be covered by an impervious stratum, such as a considerable thickness of shales, clays or marls, to hold it down, while another necessary feature is a sufficient body of porous or fissured and channelled rock below, for storing the accumulated oil. The anticlinal theory of the accumulation of gas and petroleum was favoured by the late Sir William Logan, but originated, it is believed, with a distinguished fellow member whose presence we miss at the present meeting, Dr. T. Sterry Hunt. According to this theory, the fissures, and spaces between beds of deep seated rocks being filled with water, the oil and gas, following hydrostatic laws, accumulate at the highest points, or the domes, along anticlinal folds. In his paper, Dr. Bell has brought together a large number of useful and important facts in regard to the petroleum accumulations, the methods of search, and also the details of several boring, pumping, tanking and refining operations, the last process (refining) being now almost entirely conducted on the spot, at Petrolea, by native Canadians. The productive resources of a country do not consist alone of its material wealth—its mineral treasures, the fertility of its soil, the fish in its waters—but also, and to an extent that controls all the others, in the ability of its people to convert these into profitable commodities. It is gratifying, then, to note the fact that, at Petrolea, our Canadian workmen have by their own ingenuity developed each branch of the petroleum industry to its present perfection, by carefully studying the necessities of the case, and that an excellent mechanical education has thus been afforded to a large number of intelligent men, who are not only engaged in this industry at home, but whose services are now sought in Russia, India, Australia, California, wherever there is petroleum to be secured.

Mr. Geo. F. Matthew, of St. John, an indefatigable worker, continues his account of the Fauna of the St. John group, giving a description of a remarkable trilobite found by Mr. W. D. Matthew in the grey shales at Portland, New Brunswick. This magnificent trilobite, probably the largest hitherto discovered, having an estimated surface area of 117 square inches, is honoured with Her Majesty's title, *Paradoxides regina*, as that of a sovereign who, during the many years of her reign, has greatly fostered science and art.

In the Biological Division of the fourth Section we have Dr. C. Hart Merriam's paper on the Habits of Bats, in which he answers in the affirmative, for the Hoary Bat, the question which he puts: Do any Canadian Bats migrate? the evidence consisting of the fact of the absence of the species from its breeding range in the late fall and winter, coupled with positive records of its occurrence during that portion of the year in many places far to the south. Two other species are probably migratory.

Dr. T. Wesley Mills, in his suggestive paper on Squirrels, introduces us to a phase of Biology, now existing only in its earliest stage, and which may be regarded as the starting point of a new line of enquiry, for, as he truly says, there must be a possible science of comparative psychology, as there is of comparative anatomy and physiology. The study of animal intelligence is possible, interesting, and important, whether we regard man as derived from some lower form and his intellectual as well as his physical being the result of evolution; or whether we consider that man stands wholly apart in origin either as to body or mind. In the latter case, the study of the lower forms of mind affords a useful contrast with its highest development as seen in man; in the former we aim at the construction of a ladder by which we may climb from the simplest manifestations of consciousness to the highest performances of the most gigantic human intellect. The present paper relates specially to feigning, and to the modification of intelligence by hibernation, and by contact with mankind.

Prof. Penhallow gives a Review of Canadian Botany, from the first settlement of New France to the end of the eighteenth century. This will prove of service to working botanists, and of interest, from varying points of view, to many others. Young as our country is usually looked upon, it is nevertheless old enough to have been connected in an especial manner with the beginnings of modern botany in Europe, and with the rather later developments of horticulture and arboriculture in France and Britain. In the early part of the eighteenth century, Dierville took Acadian plants to Tournefort, and Peter Kalm of Abo in Sweden, encouraged by Linnaeus, undertook his journey to America, reaching Quebec by way of Philadelphia, Albany and Lake Champlain, and, after an absence of nearly four years, returned to Abo to cultivate his American discoveries. Kalm may well be accounted the father of Canadian botany; his name is commemorated in the three northern *Kalmias*, only two of which are known to grow within our Canadian borders, although all are credited to us in recent floras. Kalm was followed by André Michaux, in 1785-86, and he reached Quebec and Montreal in 1792. Lastly, towards the close of the century, we have the Scotch botanist, Menzies, naturalist of Vancouver's Expedition, whose collections were made on the north-west coast of America and a few in the environs of Halifax harbour. They are kept in their original cases, very neatly arranged, on small sheets of paper, in portable pigeon-holed cabinets in the Herbarium Hall at the Royal Botanic Garden of Edinburgh.

Mr. George U. Hay, of St. John, N.B., and Mr. A. H. MacKay, of Pictou, N.S., give a List of the Marine Algæ of the Maritime Provinces, which will prove useful to students of these plants, whose life-histories offer an illimitable field for study.

Prof. Fowler presents, in tabulated form, a statement of the facts relating to distribution of those members of the so-called Arctic Flora, that is plants growing within the Arctic Circle, that are also inhabitants of New Brunswick. The large number of such species suggests enquiry as to the causes or conditions that have rendered New Brunswick a suitable asylum for them on their assumed northward retreat during the period of amelioration of climate succeeding the glacial epoch. The explanation is found so far, in the influences of the Gulf stream, the Arctic current and its attendant fogs, the surface contour of New Brunswick. Its rugged north and north-western portion, is intersected by rivers, with deep glens, shady ravines, cold bogs, springs and lingering snows—all tending to furnish conditions such as the little northern plants require. Mr. Payne's Observations on the seasonal development of plants at Cape Prince of Wales, Hudson Strait, throughout the growing season of 1886, form a worthy supplement to Prof. Fowler's suggestive paper, and have besides an interest entirely their own, as the first series of systematic observations of the kind made with any great



degree of care on this continent that have been placed on record. More than a quarter of a century ago an attempt was made to secure observations on the periodical phenomena of plants, their times of leafing, flowering and fruiting, at suitable points throughout Canada, and a certain amount of material was accumulated. It may be well for our Fourth Section to consider the propriety of reviving this subject, and considering whether we could not carry out some simple system of seasonal observations at leading centres in the Dominion in correspondence with those now recorded at the Botanic Gardens of Edinburgh, Glasgow, and St. Petersburg, and at other suitable points of observation in Northern Europe and Asia, so that definite vernal, æstival and autumnal lines might be carried around the whole northern hemisphere. The observations should be made, by preconcerted arrangement, and, as far as possible, on the same forms of the same species at the different points of observation. Facts thus obtained would form much needed data for treating the influences of climate as a separate factor in the discussion of questions of distribution and origin. Such information would also prove of great practical value to farmers, gardeners, foresters, pomologists, graziers, shepherds, and intending settlers.

At the double risk of proving tedious to my hearers, and unsatisfactory to those whose researches are so briefly referred to, I have thus adverted to the work of the Society's past year as embodied in the Transactions. This sample will indicate the nature and extent of the researches in which our members are engaged. When we consider that, in many cases, a single paper is the result of months or even years of labor, we may be fairly satisfied so far with what is being done. It may be that some of those inclined to assist in our work have hesitated to place their labours at disposal of the Society on the plea that the Transactions are not read. It is true that papers of immediate interest find more ready response in the scientific and literary periodicals devoted to their special branches. Our Transactions form a publication of a different kind, designed to a large extent for papers of a more or less finished character and adequately illustrated, such in fact as are likely to be of permanent utility, either for the information they contain or as a groundwork and guide for further research. To serve this latter use, they must often be loaded with references and technicalities, which, necessary as they are for the student, are altogether distasteful to the ordinary reader. It is this feature partly, and another, the tame exactness of composition often necessary for the clear statement of scientific facts, that give the heavy character attributed proverbially to the Transactions of such societies. Wherever the real function of our publication has become known, its usefulness is recognized. We are not unmindful that, in the past, much has been done by our local societies, considering the limited means at their disposal, to bring together in their several publications information relating to the country, notably among which may be named the Literary and Historical Society of Quebec, the Natural History Society of Montreal, the Canadian Institute of Toronto, and the Institute of Natural Science of Nova Scotia. But nevertheless it is a fact that hitherto information in regard to many questions in Canadian history, literature and science has had to be looked for through the scattered papers of periodicals and proceedings of societies, published in many countries, in different languages, in works so numerous as to be beyond the capacity of even the largest libraries we could hope to see established in this country. And thus, even the most favourably situated student, with all the assistance that college and library could give him, felt, after ransacking every available source, that his monograph might still be incomplete. One object of our Transactions is to remedy this evil by offering a repository for the reception of everything presented in a properly digested form that may be deemed of permanent value in relation to Canadian science, literature and history. By the continued coöperation of intellectual workers in the several departments we may hope to form a book of reference for all time—a record of Canadian research, to which the student, seeking for the latest information on any Canadian subject, may turn with some confidence that his needs will be supplied. The Council announced to us yesterday that the amount necessary to defray the expense of our publication was this year placed in the regular estimates. Can I give utterance to a better wish for the welfare of the Royal Society of Canada than to reiterate the hope expressed by the Council that the security



thus given of the permanence of our publication will act as an incentive to members to renewed efforts to make it in every way worthy of this great, progressive and rapidly developing Dominion.

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SESSION IV. (*May 25th.*)

The members of the Society assembled at 10 o'clock, a. m., and the President called the meeting to order.

MISCELLANEOUS BUSINESS.

On motion of Dr. Johnson, seconded by Mr. Carpmael, it was

"*Resolved*, that the Council do consider the advisability of having, next year, and in future years, an evening meeting in the form of a *conversazione*, at which the reports of delegates of other Societies can be received, and at which opportunity can be given for social intercourse between members, delegates and invited guests."

The Honorary Secretary then read the following communication which he had received from Mr. Sandford Fleming:—

OTTAWA, May 21st, 1888.

J. G. BOURINOT, Esq., LL.D.,

*Honorary Secretary, Royal Society of Canada.*

SIR,—I deem it respectful to the Society to address you as Secretary, in order that you may bring the remarks I desire to make before the members at the proper time and in the proper manner.

At the last annual meeting, while I was in England, the Society elected me to the office of Vice-President, and I desire to take the earliest opportunity of conveying to my fellow members a cordial expression of thanks for this most unlooked for honour.

During the six years of our existence as an organized body, the custom has been followed at each annual meeting of electing a President and Vice-President, with the implied understanding that on the expiration of the President's term of office, the Vice-President shall be elevated to the higher position. By a rigid adherence to this rule, the President would always be chosen a year in advance; that is to say, in electing a Vice-President for one year, the President for the following year would invariably be determined.

In venturing to suggest that this practice may wisely be departed from on the present occasion, I beg leave to say that no one can be more sensible than myself of the honour attached to the position of President of the Royal Society of Canada. The office has been held by men of the highest attainments and eminence in the country, and it is in itself a position to which the most gifted and learned might aspire.

I respectfully submit that I can see some objections to another rule or practice, the limiting of the term of office of any one President to a single year.

With much diffidence I ask permission to submit for consideration, that the time has now come when both practices might, with advantage to the Society be modified. I can point to other Societies where the Presidents are not changed annually. There is something to be said in favour of retaining in office one who has become familiar with its duties. It is not uncommon, when a Society has the good fortune to obtain a President preëminently fitted for the position, for his services to be retained for more than one year, in some instances, for a number of years. In view of the influence which we all desire the Royal Society to exercise, at home and abroad, I respectfully ask, whether or not it would be advisable to avail ourselves again of the services of any one of the able and distinguished men who have already so well occupied the President's chair.

I trust the members of the Society will not consider that I am intruding my opinions upon them without reason which appear to me good and sound. From a personal aspect I could not but desire

that the established custom be followed, but I have endeavoured to view the matter apart from personal considerations, and I am satisfied that, if a new policy be introduced at this stage in our history, its operation will, in a higher degree, extend the usefulness of the Society, and affirm the claim which its members are honestly making to obtain for it general respect and national confidence.

I must leave the matter with the members. I only desire further to venture the remark that, in respectfully suggesting that a change be made in the practices which have hitherto been observed, I am sincerely desirous of the well-being of the Society, on account of the good which I believe that it is destined to accomplish, and from the respect which, in common with everybody in Canada, I entertain for its founder, Lord Lorne.

Should my fellow members come to view the matter as I have endeavoured to present it, it seems to me that we would be fortunate if we again secured for the highest offices in our gift, the distinguished men whom Lord Lorne himself nominated for these positions, at the foundation of the Society.

I have the honour to be, Sir,

Your obedient servant,

SANDFORD FLEMING.

#### ELECTION OF OFFICERS.

The meeting next proceeded to the election of officers for the ensuing year, and the following gentlemen were unanimously elected :—

*President*.....SANDFORD FLEMING, C.M.G., C.E.

*Vice-President*.....ABBÉ CASGRAIN.

*Honorary Secretary*.....J. G. BOURINOT, LL.D.

*Honorary Treasurer*.... ..SIR J. A. GRANT, M.D., K.C.M.G.

#### REPORTS OF SECTIONS.

The Secretaries of the four Sections then in due order presented their Reports, as follows :—

##### *Rapport de la Section I.*

La section française de la Société Royale a l'honneur de présenter le rapport suivant sur ses opérations de 1888 :—

Neuf membres seulement ont assisté à nos séances, quatre en ayant été empêchés par la session de la législature de Québec qui se tient en ce moment, deux étant en Europe, un autre n'ayant été élu qu'à la présente session, et deux des quatre autres ayant fait parvenir à la Section, l'un des excuses qui ont été acceptées, l'autre un travail qui a été lu. Quatre des absents ont envoyé des travaux.

Quatorze études, dues à la plume de douze membres de la Section, ont été lues, et leur impression dans les mémoires de la société est recommandée.

Deux autres études, soumises par des étrangers, ont été lues.

Les membres de notre section se sont entendus pour fonder à l'Académie Française un prix annuel qui sera connu sous le nom de Prix de la Nouvelle-France, et qui sera décerné par l'Académie Française à l'auteur du meilleur ouvrage publié en langue française soit en France, soit au Canada, en conformité des règlements de l'Académie.

La section a adopté à l'unanimité une résolution de félicitations à M. l'abbé Casgrain sur l'honneur que l'Académie Française lui a conféré en couronnant son dernier livre.

Notre section a décerné trois diplômes d'encouragement à Messieurs Nérée Beauchemin, J. A. Poisson et Joseph Edmond Roy, pour leurs travaux poétiques et historiques publiés en 1887-88. On

se rappelle qu'elle y a été autorisée par l'adoption de son rapport pour 1886, et que les diplômes devront être signés par le président et le secrétaire de notre section et contresignés par le président et le secrétaire généraux.

Monsieur Joseph Tassé n'ayant pendant trois années consécutives fait acte de présence, ni offert de travail, ni présenté par écrit à la société de satisfaisantes raisons d'abstention, tombe sous le coup du 3e paragraphe de l'article 7 du règlement, et il y a lieu de lui choisir un successeur.

Nous avons fait nos élections annuelles avec le résultat suivant :—

*Président*, M. L. PAMPHILE LEMAY,

*Vice-président*, M. l'ABBÉ HOSPICE VERREAU.

*Secrétaire*, M. ALPHONSE LUSIGNAN.

FAUCHER DE SAINT-MAURICE, *Président*.

A. LUSIGNAN, *Secrétaire*.

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*Report of Section II.*

I have the honour to report that Section II has elected as office-bearers for the ensuing year :—

JOHN READE, *President*.

JOHN WATSON, M.A., LL.D., *Vice-President*.

GEORGE STEWART, JUN., D.C.L., D. Litt, *Secretary*.

The Committee on Publications is composed of Dr. Daniel Wilson, *Chairman*; John Reade and George Stewart, Jun., *Secretary*.

The Committee appointed to consider the question of publishing monographs on old books relating to Canadian history, travel, etc., while it has fully sympathised with the objects for which it was called into existence, and has endeavoured, as far as lay in its power, to promote those objects, has been unable for lack of funds, to have reimpressions made of works of the character indicated. It is, at the same time, of opinion that our Section may render considerable service to the cause of historical research by the individual work of its members, several of whom are connected with historical societies in their respective localities. The Committee's counsel and suggestions have, in this direction, been already fruitful of good results, and it is to be hoped that, in the near future, our Section of the Royal Society of Canada, will have enlarged opportunities for discharging the task, the consideration of which was entrusted to the Committee.

This report was signed by Messrs. John George Bourinot, *Chairman*; John Reade, John Lesperance and George Stewart, Jun.

The following papers were read :—

- I. The Last Decade of French Rule at Quebec, 1748-59. By J. M. LEMOINE.
- II. The Antiquity and Philology of the Indian Languages of Canada. By WM. KIRBY.
- III. On the proper uses and functions of the Literary Sections of the Royal Society. By WM. KIRBY.
- IV. The Romance of Canadian History. By JOHN LESPERANCE.
- V. Imperial Federation. By REV. DR. DAWSON.
- VI. The Basques in North America. By JOHN READE.
- VII. On the Grammar of the Kwagiutl People of Vancouver Island. By the REV. A. J. HALL,  
(Submitted by DR. GEORGE M. DAWSON.)
- VIII. Historic Places in Canada. By REV. DR. WITHROW.
- IX. On the Indian tribes of British Columbia. By DR. FRANZ BOAS. (Read by title, and submitted by DR. BELL.)
- X. Notes on the Snanaimug. By DR. FRANZ BOAS. (Submitted by DR. G. M. DAWSON.)

XI. On some Indoor and Outdoor Games of the Wabanaki Indian Tribes. By Mrs. W. W. BROWN. (Submitted by JOHN READE.)

XII. François Coppée: a Critique, with illustrated translated specimens. By GEORGE MURRAY, B.A.

The Section reports that a vacancy exists, owing to the retirement of Mr. Charles Lindsey of Toronto.

GEORGE STEWART, JUN., *Secretary*.

*Reports of Section III.*

The number of members in attendance was ten. The absent members were :—Profs. Chapman, Cherriman, Haanel, Harrington, Loudon, and MacGregor, Drs. Fortin, Girdwood and Hunt. Of these, Profs. Cherriman and MacGregor, and Drs. Fortin and Hunt were known to be absent from unavoidable causes—further, of the latter, Dr. Hunt forwarded two papers, and Prof. MacGregor one, for reading before the Section.

The following is a list of papers read in full, in abstract, or by title:—

- I. Determination of time by transits across the vertical of Polaris. By E. DEVILLE.
- II. Occultations of fixed stars by the moon. By W. F. KING, M.A.
- III. A table of the cubical expansion of solids. By Prof. J. G. MACGREGOR.
- IV. Elements de géométrie. By C. BAILLARGÉ.
- V. On the extended use of oblique coördinates in geometry of three dimensions. By Dr. A. JOHNSON.
- VI. The foundations of chemistry. By Dr. T. STERRY HUNT.
- VII. The classification and nomenclature of metalline species. By Dr. T. STERRY HUNT.

The following Resolution was adopted:—

“That the Secretary be requested to report to the Honorary Secretary of the Society the names of all members of the Section who have absented themselves from the meetings of the same for three years in succession, without presenting a paper, or assigning satisfactory reasons in writing.”

The officers elected for the ensuing session, were:—

E. DEVILLE, *President*.

SANDFORD FLEMING, C.M.G., *Vice-President*.

G. C. HOFFMANN, *Secretary*.

(Signed)

E. DEVILLE, *Vice-President*.

G. C. HOFFMANN, *Secretary*.

*Report of Section IV.*

The number of members of the Section who attended the meeting was twelve, but three of the members who were not able to be present sent papers to be read.

The following is a list of the papers which were read, either in full or by title, though some of these were subsequently withdrawn:—

- I. Presidential Address. By DR. R. BELL.
- II. On the Nymphaeaceæ. By PROF. G. LAWSON.
- III. Revision of the Canadian Equiseta. By PROF. G. LAWSON.
- IV. Notes on Nova Scotia Gold Mines. By E. GILPIN, JUN.
- V. On some Remarkable Organisms of the Silurian and Lower Devonian Rocks of Acadia. By G. F. MATTHEW.

- VI. On some of the Geological Relations of New Brunswick and Maine. By PROF. L. W. BAILEY.
- VII. *Homalonotus Dawsoni*, Hall, of Nova Scotia. By REV. DR. HONEYMAN.
- VIII. *Serpulites longissimus*, Murchison, of Wales and Arisaig, N.S. By REV. DR. HONEYMAN.
- IX. The Giant Trilobite of Moose River (N.S.), New Mine. By REV. DR. HONEYMAN.
- X. Observations on Early-Ripening Cercals. By W. SAUNDERS.
- XI. On the Origin of some Geographical Features in Canada. By Dr. R. BELL.
- XII. Hibernation in Mammals. By PROF. T. WESLEY MILLS. (Communicated by Dr. BELL.)
- XIII. Illustrations of the Fossil Fishes of the Devonian Rocks of Canada. By J. F. WHITEAVES.
- XIV. On Nematophyton and allied forms from the Devonian (Erian) of Gaspé and Bay des Chaleurs. By PROF. PENHALLOW, with introductory geological note by SIR WILLIAM DAWSON.
- XV. Gisements de gaz naturel dans la province de Québec. By ABBÉ LAFLAMME.
- XVI. Note on the Preliminary Examination of a collection of Cretaceous Plants from Port McNeill, Vancouver Island. By SIR WILLIAM DAWSON.
- XVII. Contributions to the Bryology of the Dominion of Canada. By PROF. KINDBERG (of Linköping, Sweden) and PROF. MACOUN.
- XVIII. The Possibilities of Canada's great Reserve. By Lieut.-Governor the Hon. JOHN SCHULTZ.
- XIX. The Prospective value of Northern and Western Canadian Waterways. By Lieut.-Governor the Hon. JOHN SCHULTZ.

In addition to these, the titles of seven other papers were submitted by the President of the Section.

The Society having remitted to this Section for consideration the action which it deemed best to take in the matter of the International Congress of Geologists, to be held in London this summer. It was moved by Sir William Dawson, seconded by Dr. Selwyn, and resolved:—

“That instead of the minute submitted to the Section, recommending a Committee with reference to the International Congress of Geologists, it is the advice of this Section that such individual members as may find it convenient, should attend the meeting as representatives of the Society, and that, in the event of any official invitation to send representatives being received, the Council be authorized to select such representatives.”

In reference to the seven papers whose titles were presented at the meeting of the Section for the first time, it was moved by Sir William Dawson, seconded by Dr. Selwyn, and resolved:—

“That certain papers not passed upon by the Council be submitted to it for its action, and that authors be informed that their papers must be in the hands of the Secretary before July 1st.”

The officers elected for the ensuing year, were:—

*President*, PROF. L. W. BAILEY.

*Vice-President*, DR. G. M. DAWSON.

*Secretary*, J. F. WHITEAVES.

It was resolved also:—

“That all members of the Section present in Ottawa be appointed an editing committee.”

J. F. WHITEAVES, *Secretary*.

#### LETTERS FROM AFFILIATED SOCIETIES.

In the absence of delegates, the Honorary Secretary read the following letters representing the work of affiliated Societies in the habit of making annual reports:—

(1.) *Le Cercle de l'A B C d'Ottawa.*

OTTAWA, 14 mai, 1888.

MONSIEUR :—

En réponse a votre bienveillante invitation, je dois vous dire que nous avons été obligés de changer de local cet hiver, et qu'en conséquence nous n'avons pas jugé nos travaux assez importants pour en faire un rapport a votre distinguée société.

• L'an prochain, si vous avez la bienveillance de nous inviter, nous ferons un rapport pour les deux années, a la fois.

En vous remerciant cordialement de votre invitation, et en vous priant de nous excuser de n'avoir pas répondu plus tôt.

J'ai l'honneur d'être, monsieur, etc., etc.,

SÉVÈRE GÉLINAS,

*Secrétaire du Cercle de l'A B C.*

(2.) *Nova Scotia Institute of Natural Science.*

I have the honour to submit a list of papers read before the Nova Scotia Institute of Natural Science during the past year:—

1. Glacial Geology of Nova Scotia, by Dr. Honeyman.
2. Diurnal Lepidoptera of Nova Scotia, by A. Silver.
3. The Elementary treatment of the Propagation of Longitudinal Waves, by Prof. J. G. MacGregor.
4. Carboniferous Flora with attached Spirobes, by Dr. Honeyman.
5. Perforated Stone Implements: their uses, by Rev. J. Ambrose.
6. Studies in the Provincial Museum, (1) Fishes, (2) Fish Development, by H. Peters.
7. Analyses of Cape Cape Breton Coals, by E. Gilpin, M.A.
8. Lockyer's Spectroscopic Investigations of Meteorites, by Prof. J. G. MacGregor.
9. The Life History of the Plant, by Prof. Lawson.
10. The Japanese Magic Mirror of the Museum, by H. Piers.
11. Nova Scotia Surface Geology, mapped, systematised and illustrated, by Dr. Honeyman.
12. Our Museum Meteorites; Celestial and Terrestrial Teachings; Daulrée, by Dr. Honeyman.

An increased interest in the meetings of the Society is manifested from the larger attendance at the monthly reading of papers during the season. This may be, in some measure, due to the prominence now given to scientific instruction in the common schools of the Province.

A copy of the Proceedings and Transactions of the Society for the year 1886-87 accompanies this report.

MAYNARD BOWMAN.

(3.) *Historical and Scientific Society of Manitoba.*

WINNIPEG, May 21, 1888.

DEAR SIR,

On behalf of the Historical and Scientific Society of Manitoba, I have the honour to report that up to the present, the following papers have been read, since last year's report:—

1. John Tanner, Borderer, by Rev. Dr. Bryce.
2. The Adventures of a Fur Trader, by Mr. C. N. Bell.
3. Personal Reminiscences of the Fenian Raid of 1871, by Hon. G. McMicken.

I have the honour to be, sir, yours, etc.,

A. BOWERMAN,

*Cor. Sec. Hist. and Scientific Soc. of Manitoba.*

(4.) *Nova Scotia Historical Society.*

HALIFAX, N. S., May 18th, 1888.

Memorandum of papers read before this Society during the tenth season, 1887-1888 :—

1887. Nov. 10. (Legislative Library). A Study of "Sam Slick," by F. Blake Crofton.

Dec. 8. (Church of England Institute). Early Journalism in Nova Scotia, by J.J. Stewart.

1888. Jan. 29. (Young Men's Christian Association). Settlement of Early Townships, illustrated by an old Ceñsus, by David Allison, LL.D.

Feb. 24. (Legislative Library). Thomas Chandler Haliburton: Writer and Thinker, by F. Blake Crofton.

Feb. 20. (Legislative Council Chamber). A Note on the "Aroostook War," by Chas. G. D. Roberts.

March 29. (House of Assembly). Howe and his Contemporaries, by the Hon. J. W. Longley.

April 10. (Argyle Hall). The Loyalists of Shelburne, by Rev. T. Watson Smith.

Correct List.

F. BLAKE CROFTON,  
*Corresponding Sec. Nova Scotia Historical Soc.*

## CONCLUDING BUSINESS.

The following resolutions were then proposed and agreed to :—

1. "That the Honorary-Secretary do communicate with Mr. Tassé and ascertain whether he still wishes to continue a fellow of the Society." (On motion of Mr. Faucher de Saint Maurice, seconded by Abbé Casgrain.)

2. "That Abbé Provancher and Mr. A. H. McKay be elected fellows of this Society." (On motion of Dr. Stewart, seconded by Dr. Johnson.)

3. "That instead of the minute submitted to the Section recommending a committee with reference to the International Congress of Geologists it is the advice of the Section that such individual members as may find it convenient should attend the meeting as representatives of the Society, in order to express the sympathy of the Society in the general objects of the Conference." (On the motion of Dr. Selwyn, seconded by Mr. Macfarlane.)

4. "That the thanks of the Society be cordially given to the President and officers of the Society, for their services during the past year." (On motion of Monsignor Hamel, seconded by Dr. Stewart.)

5. "That the thanks of the Society be communicated to the Speakers of the two Houses of Parliament for the courtesies rendered to its members during the present meeting." (On motion of Sir J. A. Grant, seconded by Mr. Saunders.)

The meeting then adjourned.



# THE ROYAL SOCIETY OF CANADA.

FOUNDER : THE RIGHT HONOURABLE THE MARQUIS OF LORNE.

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The Council for 1888-89 comprises the President and Vice-President of the Society, the Presidents, Vice-Presidents and Secretaries of Sections, the Honorary Secretary, and the Honorary Treasurer, besides ex-Presidents of the Society (Rule 7) during three years from the date of their retirement.

# THE ROYAL SOCIETY OF CANADA.

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WILSON, SIR DANIEL, LL.D., F.R.S.E., President of Uni-  
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WITHROW, REV. W. H., D.D., *Toronto.*

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## CORRESPONDING MEMBERS.

## THE MARQUIS OF LORNE.

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- OSLER, W., M.D., Johns Hopkins University, *Baltimore, Md.*

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SOCIÉTÉ ROYALE DU CANADA

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MÉMOIRES

SECTION I

LITTÉRATURE FRANÇAISE, HISTOIRE, ARCHÉOLOGIE, ETC.

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ANNÉE 1888



I — *La fin de la domination française et l'historien Parkman,**Par* HECTOR FABRE.

( Lu le 24 mai 1888. )

## I

L'historien américain Parkman a terminé la série d'ouvrages qu'il a consacrés au Canada, par la publication de son livre sur Wolfe et Montcalm, dernier épisode de l'histoire française dans cette partie de l'Amérique. Son œuvre se divise en deux séries. La première partie va, des *Pionniers de la France au nouveau monde*, au volume qui porte le titre : *L'Ancien Régime au Canada*. La seconde partie, à laquelle manque encore le récit des événements qui ont rempli la première moitié du XVIII<sup>e</sup> siècle, s'étend jusqu'à la conquête.

Cette histoire du Canada se recommande par des qualités de premier ordre. Elle s'impose à l'attention du public canadien, à son examen, et, sur bien des points, à son admiration. Deux inspirations s'y accusent, bien différentes l'une de l'autre, qui se mêlent et se confondent parfois tellement que si le lecteur n'est pas en garde il accepte comme venant de l'une ce qui procède de l'autre.

Dans la première partie de sa tâche, celle qui touche à ce qu'on pourrait appeler l'ère des découvertes, Parkman a montré quelques-uns des dons les plus rares de l'historien ; et parmi ces dons, le premier de tous : la passion innée de cette histoire qu'il allait reconstituer, l'intuition de ces prodiges qu'il allait évoquer, le sentiment vrai de ces époques héroïques. Il a aimé avec passion tous ses héros, les personnages divers de ce long drame joué sur ce vaste théâtre inconnu, devant une poignée de spectateurs, au milieu desquels sans cesse les événements recrutaient de nouveaux acteurs. Il semble qu'il ait vécu avec eux, qu'il les ait suivis de sa personne, — en tous cas il les a suivis de toute son âme, — dans leur course à travers le continent. Il était là lorsque Cavelier de La Salle a découvert le Mississipi ; là aussi lorsque Brébœuf et Lallemant ont souffert le martyre et donné leur sang pour ce pays, qui ne leur était rien, et que le sacrifice de leur vie seul leur rendait cher. La foi, qu'il n'a pas dans l'âme, brille alors sous sa plume. Sceptique, il admet tous les prodiges, pourvu qu'ils se passent au XVII<sup>e</sup> siècle et dans la forêt. Il sait, s'il ne croit pas ; et il montre ce qu'il a vu comme s'il croyait.

Il semble en même temps que ces immensités, il les ait vues et parcourues lorsqu'elles étaient encore solitude ; il semble qu'il les ait vues et parcourues avant nous, autrement que nous, avec les compagnons même de Champlain, à bord d'un canot d'une de ces flottilles montées par les Indiens, qu'il a si brillamment décrites, lorsqu'au printemps elles sillonnaient les eaux du lac Champlain ou côtoyaient les bords délicieux du lac Georges.

Le paysage redevient sauvage, et le passé sous nos yeux y reprend sa place. Bougainville, Bourlamaque et Lévis renaissent, et brillent comme autrefois.



Par cette suite de récits merveilleux, Parkman a révélé notre histoire aux Américains, nos voisins. Il leur a montré ce que la France avait fait pour eux, avant Lafayette, et prouvé que toutes les grandes découvertes faites sur ce sol, où naquit leur république, ont été faites par des Français. Jusque-là ils étaient un peu sous l'impression que leur histoire datait de la guerre de l'indépendance. Ils savent maintenant qu'elle date de plus loin, et, faut-il le dire ? de plus haut. La constitution rédigée par Jefferson, si parfaite qu'elle soit, paraît un peu pâle, comparée aux aventures héroïques qui lui ont battu la voie.

Il n'y a pas seulement plus de poésie, mais encore plus de vérité humaine, de valeur positive, appréciable, que dis-je ? négociable, dans les entreprises auxquelles Cavelier de La Salle et tant d'autres ont attaché leur nom, et dont les débuts obscurs, tourmentés, ont eu des suites si éclatantes, des résultats si durables. Non vraiment, si grand qu'ait été le service rendu par la France à l'Amérique lorsqu'elle lui a donné la liberté, et en a reçu la Révolution, ce n'est, ni le plus grand, ni le plus mémorable. A tout bien considérer, à embrasser tout le passé, ce n'est pas la statue de la Liberté qu'on aurait dû ériger à l'entrée du port de New-York, c'est la statue de la France.

Avant Parkman, un des nôtres, Garneau, avait écrit cette histoire de deux siècles, remplis de faits glorieux. C'est lui qui a ouvert la voie, déblayé le terrain, qui nous a appris à nous-mêmes notre passé. Nous lui devons une reconnaissance éternelle, et Parkman, l'exemple qu'il a suivi, sans bien marquer nulle part à quel point cet exemple a pu lui être utile. Lorsque Garneau a commencé à écrire notre histoire, ce qui devait lui servir à élever le monument était épars, dispersé, oublié, en grande partie ignoré ; et il était sans autre ressource que celle qu'il puisait dans son patriotisme. Il a élevé le monument, seul et de ses propres mains. Tout lui échappait ; il avait tout à conquérir, même cette langue française qui ne se livre tout entière que dans l'intimité d'un long commerce. Domptée par l'effort de ce patient ouvrier, séduite par l'âme de ce généreux patriote, elle finit par lui obéir, par le suivre et par revêtir d'une forme correcte, sobre et forte, le récit fidèle. Parkman, avec son art achevé, n'a fait oublier aucune de ses puissantes descriptions de bataille. Elles sont restées les plus exactes et les plus belles. Ce sont celles-là qu'on relira toujours. A tous les titres, Garneau est et demeurera l'historien national du Canada.

Dans la seconde partie de son œuvre, dans celle qui raconte les principaux événements qui ont marqué la lutte engagée en Amérique entre la France et l'Angleterre, entre la colonie française et les colonies anglaises, l'inspiration de Parkman s'est modifiée. Il se garde de rabaisser ses héros, de sacrifier Montcalm à Wolfe — il est trop artiste pour cela, trop épris de son sujet pour son sujet lui-même ; il aurait craint, en diminuant ses personnages, de diminuer l'intérêt et le prestige de son œuvre ; — mais il prend parti contre le régime français, auquel il attribue notre faiblesse puis notre défaite ; contre les Canadiens, auxquels il dispute leur part dans tant de victoires et de défaites aussi glorieuses que des victoires ; contre les Acadiens, dont le sort lamentable ne lui arrache ni un mouvement de pitié, ni un cri d'indignation ; contre le gouvernement français, à qui il reproche, après bien d'autres, de n'avoir pas tout subordonné à la préoccupation de conserver son empire colonial.

## II

Au début de son livre sur Wolfe et Montcalm, Parkman caractérise ainsi la dernière lutte qui va s'ouvrir, et dont l'issue doit être la chute de la France en Amérique.

“ C'était la lutte du passé contre l'avenir, dit-il, de l'ancien contre le nouveau, de la torpeur morale et intellectuelle, de l'absolutisme contre la liberté rude, incohérente, embryonnaire, néanmoins pleine de vitalité féconde.”

Après avoir ainsi posé la question engagée entre nous et les colonies anglaises, Parkman explique pourquoi nous devons être vaincus :

“ Les colonies anglaises, dit-il, rangées le long de l'océan, n'avaient pas de grandes voies dans l'intérieur, et d'une certaine façon elles étaient comme enfermées entre les montagnes et la mer. Au milieu du XVIII<sup>e</sup> siècle, elles comptaient, de la Géorgie au Maine, une population de 1,160,000 habitants. Par le recensement de 1754, le Canada n'en avait que 55,000. En y ajoutant l'Acadie et la Louisiane, le chiffre de la population d'origine française pouvait dépasser un peu 80,000.

“ La différence est énorme ; de là on a conclu que le succès des colonies anglaises et la défaite des colonies françaises n'avaient pas eu pour cause leurs systèmes religieux et politique différents, mais uniquement la prépondérance numérique des unes sur les autres. Mais cette prépondérance même découlait de la supériorité d'un régime sur l'autre.

“ Nous avons dit déjà, et l'on ne saurait le répéter trop souvent, qu'en faisant du Canada une sorte de forteresse de la religion d'Etat, le sanctuaire des sanctuaires de l'orthodoxie catholique, les guides spirituels de la Couronne avaient fait perdre à leur pays son empire d'outre-mer.”

Il y aurait d'abord à examiner si le régime qui convenait aux Anglais convenait aussi bien aux Français ; si ce n'est pas perdre absolument son temps que de reprocher à un peuple de se conduire autrement qu'un autre peuple, et, ayant un génie différent, d'avoir une manière différente. C'est lui dire : Mais pourquoi restez-vous vous-mêmes ? Français, pourquoi n'êtes-vous donc pas des Anglais ? Anglais, quand serez-vous donc des Français ? Esprit, tempérament, traditions, actions, institutions, qualités et défauts, tout se tient ; et il est aussi injuste de juger un peuple d'après les idées ou les procédés d'un autre peuple, qu'impolitique d'imposer le régime de l'un à l'autre. Pour faire quelque chose de grand, de durable, une nation doit d'abord rester fidèle à elle-même. Ce ne sont pas toutes les belles qualités qu'elle tenterait d'emprunter à ses voisins qui la sauveraient jamais. On peut discuter à perte de vue sur les mérites relatifs de la colonisation anglaise et de la colonisation française, mais ce qui est bien sûr, c'est qu'on n'obtiendra jamais que les Français colonisent à l'anglaise ; s'ils le tentaient, ils échoueraient et promptement.

Obéissant à leurs idées, à leurs instincts, serrant de près leurs intérêts, étroitement liés à eux, les Anglais restèrent près de l'océan, et, comme dit Parkman, enfermés entre la mer et les montagnes.

Ils n'avançaient dans l'intérieur qu'au fur et à mesure des besoins de leur commerce. Ils n'étaient pas hantés par la vision des découvertes. Le contingent qu'ils ont fourni au bataillon des explorateurs est faible, sinon nul. Ils laissaient les Français préparer le pays, le percer de toutes parts, le pénétrer en tous sens, l'ouvrir à tout venant. Ils s'en préoccupaient pour le moment si peu que Parkman avoue qu'au sud, on connaissait à peine même le nom du Canada. Ils s'en tenaient à leurs affaires comme de fidèles culti-

vateurs et d'honnêtes négociants. C'est pourquoi leurs établissements prospéraient, et, leurs établissements prospérant, pourquoi le chiffre de la population s'élevait si rapidement.

Les Français ne pensaient pas uniquement à cultiver leurs champs, comme s'ils avaient été encore en France, dans le domaine étroit de la vie de province. Ils songeaient avant tout à l'étendre. Ils étaient dévorés de l'ambition de tout voir, de planter partout la croix et le drapeau. Ils ne voulaient rien laisser à découvrir aux autres. Puisque la destinée les avait jetés sur un continent nouveau, rien sur ce continent ne devait leur échapper. Ils n'avaient pas traversé les mers pour retrouver la Picardie, pour reconstituer une petite Normandie au loin. C'était pour conquérir l'Amérique du Nord tout entière.

Et, quoiqu'ils n'eussent pas une connaissance aussi parfaite de la liberté que leurs voisins, ils avaient une allure bien autrement libre. Les Indiens ne s'y trompaient pas. C'étaient en eux qu'ils reconnaissaient les hommes libres. D'instinct, ils allaient vers eux. S'ils ne trouvaient pas dans l'alliance des Français la liberté compassée, méthodique, que forment les lois organiques, ils reconnaissaient dans leur nature et leurs relations la vraie liberté, celle des sentiments, des idées, des mœurs.

Comment Parkman n'a-t-il pas reconnu que ce régime, qu'il trouve tout à coup détestable, est celui-là même qui a opéré les grandes choses qu'il vient de raconter, et qui nous avait livré la plus grande partie du continent ? Il avait développé en nous, avec le patriotisme et la foi, l'esprit d'aventure, le goût des explorations, le courage et l'audace.

Le système contraire, le régime colonial anglais, qu'avait-il fait ? Parkman lui-même va nous le dire. Par une contradiction singulière, après avoir attribué au régime français notre perte, il assure que les défauts inhérents au régime colonial anglais étaient tels qu'ils suffisaient à enlever aux colonies anglaises tous les avantages qu'elles auraient pu tirer de leur ascendant numérique. Il trace un tableau bien curieux du régime populaire appliqué aux colonies. Les colonies anglaises, celles du moins qui n'étaient pas directement menacées, ne songeaient pas à se préparer à la guerre, mais à voter, à voter contre le gouvernement, bien entendu, à refuser ou tout au moins à disputer au gouvernement les subsides qu'il jugerait nécessaires pour continuer la guerre, à y mettre des conditions inacceptables et blessantes pour lui.

“ C'était, dit Parkman, le moment où il était le plus nécessaire d'agir qu'on choisissait de préférence pour faire de l'obstruction.”

On connaissait déjà, à côté de nous, le secret des crises politiques ; et l'on n'a pas eu depuis à en perfectionner la méthode autant qu'on le croit.

“ Toutes les colonies anglaises, continue Parkman, étaient soumises à la législation populaire ; sans son assentiment, on ne pouvait lever ni argent, ni hommes. Ces corps élus étaient parfois factieux et égoïstes, et pas toujours clairvoyants et raisonnables.”

Et quelles étaient les conséquences de ce régime ? La suppression de tout esprit public, l'altération profonde du patriotisme.

La querelle politique occupait la première place, la question patriotique passait en second. On redoutait plus le gouvernement que l'ennemi. C'était le principal et, pour bien des gens, le seul ennemi à combattre. Franklin, le sage Franklin, voulait faire une concession : — Battons, disait-il à ses concitoyens, d'abord le gouverneur, et nous battons l'ennemi ensuite. Mais l'opposition n'entendait pas de cette oreille, et dénonçait le piège. Elle déclarait que les bruits d'invasion étaient inventés par des politiques roublards, et

concluait en disant : — Battons le gouverneur et laissons l'ennemi en paix. Car pour battre l'ennemi, il fallait payer d'abord, et elle ne voulait pas payer.

Cette aversion pour le vote du budget de la guerre allait si loin que les Virginiens, dit Parkman, déclaraient qu'ils aimaient mieux être conquis que de renoncer à leurs privilèges.

Les conséquences de cet état d'esprit, il va lui-même nous les indiquer :

“ Tandis que, pour les colonies du nord, le Canada était l'ennemi ancien et funeste, les colonies s'étendant vers le sud le connaissaient à peine de nom ; corps et âme, on y était tout entier à la lutte contre le gouverneur, à la lutte générale pour le *self rule*, le “ coloniste ” n'était pas alors un Américain ; c'était simplement un provincial et un provincial à l'esprit étroit.”

Si les Français, emportés par leur ardeur, n'avaient pas inquiété sans cesse leurs voisins ; si Vaudreuil, mal inspiré à tous les points de vue, n'avait pas lancé sur les colonies anglaises des expéditions d'Indiens qui y mettaient tout à feu et à sang, les Virginiens seraient restés chez eux à discuter le budget. Mais Vaudreuil ne se doutait pas de ce que produit l'amour de la discussion dans un corps délibérant ; il ignorait les entraînements du vote, les mystères du scrutin. Sans cela, il aurait vu là la meilleure des diversions, le plus utile des concours, et le dénouement de la guerre aurait peut-être été une crise ministérielle en Virginie.

Pendant qu'on délibérait à Boston pour occuper les loisirs de l'hiver, que faisait-on de l'autre côté de la frontière, à Montréal et à Québec ? Les deux villes étaient en fête, on s'y amusait, comme à Versailles, entre deux campagnes sur le Rhin. Montcalm, Bougainville, Lévis, y avaient retrouvé les plaisirs de la France, brave, spirituelle et galante.

Montcalm écrivait à sa femme :

“ Montréal est une ville aussi plaisante qu'Alais en temps de paix, et plus agréable maintenant que le gouverneur s'y trouve. Pour ce qui est de Québec, elle égale les plus belles villes de la France, à part une douzaine. Les dames y sont spirituelles, galantes, dévotes. Le jeu à Québec, la danse et la conversation à Montréal.”

A Bourlamaque, resté à Québec, il écrit et soulève un coin plus léger du voile :

“ Je suis heureux que vous parliez quelquefois de moi aux trois dames de la rue du Parloir ; je suis bien touché de leur souvenir, particulièrement du souvenir de l'une des trois, chez laquelle par moment j'ai trouvé trop d'esprit et d'agrément pour mon repos.”

Parkman, sans avoir l'air d'y mettre de malice dans tous les cas en y apportant la discrétion d'un galant homme, dit que dans la correspondance de Montcalm et de Bourlamaque, il est plusieurs fois question de ces trois dames de la rue du Parloir. Imitons sa réserve ; mais il est permis de croire que le gouverneur de la Virginie aurait volontiers échangé la compagnie des quakers, les entretiens avec la commission du budget, pour la société des trois dames de la rue du Parloir.

### III

Ayant jugé le régime colonial français, et l'ayant condamné, Parkman est sévère pour les Canadiens, que ce régime a formés. Voici les considérants de son arrêt :

“ Le Canadien, dit-il, ignorant tout, sauf ce que les prêtres avaient cru bon de lui

apprendre, n'avait jamais entendu parler de Voltaire ; et, s'il l'avait connu, il l'eût pris pour le diable en personne. Il avait, il est vrai, un esprit d'insubordination puisé dans la liberté des forêts ; mais, si son instinct se révoltait, son esprit et son âme étaient passivement soumis. Le contrôle absolu qu'exerçait sur lui l'Eglise lui avait enlevé cette indépendance d'esprit et de caractère, sans laquelle, dans les conditions de la vie moderne, un peuple doit se résigner à une situation d'infériorité."

Il faut être juste. Si le Canadien ignorait Voltaire, Voltaire le lui rendait bien ; il ne connaissait pas non plus le Canada. Il est douteux que le dire de Voltaire, que la fréquentation de son esprit dissolvant eût été bien utile aux Canadiens. L'était-elle même à la France ? Mais Voltaire, lui, aurait pu, aurait dû, son génie étant universel, connaître le Canada ; il aurait pu le servir auprès de l'Europe, le servir puissamment auprès de la France. Non seulement il n'en fit rien, mais voici comment, il célébra la perte du Canada :

" Voltaire, dit Garneau, retiré à Ferney, célébra le triomphe des Anglais à Québec par un banquet, non comme le triomphe de l'Angleterre sur la France, il est vrai, mais comme le triomphe de la liberté sur le despotisme. Il prévoyait que la perte du Canada serait la délivrance des colonies anglaises, et par suite l'affranchissement de toute l'Amérique. Après le banquet, la compagnie se retira dans une galerie terminée par un théâtre élégant, où l'on joua le *Patriote insulaire*, pièce remplie de sentiments ardents pour la liberté. Voltaire parut lui-même dans le principal rôle. Après la pièce, les fenêtres de la galerie s'ouvrirent, et l'on vit une cour spacieuse illuminée et ornée de trophées sauvages. On fit partir un feu d'artifice au bruit d'une musique guerrière. L'étoile de Saint-Georges lançait des fusées au-dessous desquelles on voyait représentée la chute du Niagara."

Après cela on peut pardonner aux Canadiens de n'avoir pas été voltairiens. Mais Parkman ne leur en garde pas moins rancune. Cela perce un peu partout, sans qu'on puisse pourtant saisir une flagrante injustice. C'est une malveillance latente.

Les troupes coloniales n'avaient pas naturellement la solidité éprouvée des troupes régulières. En rase campagne elles n'avaient pas toute leur valeur. Mais dans la guerre de partisans elles étaient sans rivales. On le vit bien au combat de Monongahéla, où les troupes régulières commandées par Braddock perdirent 800 hommes sur 1200, pour vouloir persister à se battre selon toutes les règles, tirant sur leurs propres soldats, tirant surtout sur les arbres pour atteindre un ennemi invisible. Tous y auraient passé, si enfin Braddock n'était tombé avec le règlement.

Vaudreuil, qui était Canadien, et un peu adonné à la vantardise, assurait qu'avec les Canadiens et les Indiens seuls il aurait sauvé la colonie.

Montcalm, esclave de la discipline, met du temps à l'admettre. Il gagna d'abord le combat d'Oswego contre toutes les règles, mais d'après l'avis de Vaudreuil ; il s'en excuse au ministre dans les termes que voici : " La conduite que j'ai tenue en cette occasion, dit-il, et les dispositions que j'avais arrêtées, sont si fort contre les règles ordinaires, que l'audace qui a été mise dans cette entreprise doit passer pour de la témérité en Europe ; aussi je vous supplie, Monsieur, pour toute grâce, d'assurer à Sa Majesté que, si jamais elle veut, comme je l'espère, m'employer dans ses armées, je me conduirai sur des principes différents."

Avec le concours des Canadiens, selon les règles cette fois, il gagna la bataille de Carillon, la plus brillante de sa carrière et de nos annales, et leur pardonna.

Parkman aussi finit par leur rendre justice :

“ Néanmoins, dit-il, (malgré le joug clérical, malgré l'oubli de Voltaire) le Canada avait une vigueur propre. Ce n'était pas seulement sous le rapport religieux qu'il différait de la mère patrie. S'il n'avait pas tout à fait échappé à sa corruption, il n'avait rien pris de son esprit efféminé.

“ La masse de la population vivait dans une rude pauvreté, point abjecte comme celle des paysans de France, ni aggravée encore par l'impôt, tandis que les gens des hautes classes, plus ou moins engagés dans les poursuites de la guerre et des aventures, habitués à la vie menée dans les forêts, étaient aussi rudes que leur climat. Les troupes régulières de France venues pour défendre le pays, à leur contact prirent leur forte allure.”

L'historien aurait pu ajouter que ces rudes soldats donnaient tout : leur sang et leur argent ; ils n'avaient jamais, comme leurs voisins, songé à rogner le budget de la guerre.

#### IV

Sévère pour les Canadiens, Parkman est injuste pour les Acadiens. Il est resté insensible à leur malheur, le plus touchant que l'histoire ait connu. Cette déportation en masse de tout un peuple, cette dispersion de 7 ou 8,000 habitants à travers le monde, est racontée froidement, sans émotion, avec le seul souci de montrer que les spoliateurs ne voulaient pas spolier, mais extirper du sol la race même.

“ L'humanitarisme de la Nouvelle-Angleterre, dit-il, faisant allusion à Longfellow et à son admirable poème d'*Evangeline*, se fondant en sentimentalité pour une légende d'infortune, a été injuste pour les siens. Quel que soit le jugement qu'on prononce sur la cruelle mesure de la déportation en masse, elle ne fut appliquée que lorsque toutes les ressources de la patience et de la persuasion eurent été épuisées. Les agents de la cour de France, civils, militaires et ecclésiastiques, avaient fait d'une sorte d'acte de rigueur une nécessité.

“ Nous avons vu par quelles viles manœuvres ils avaient amené en Acadie un état de choses intolérable et qu'il était impossible de laisser durer. Ils provoquèrent la tempête, et, lorsqu'elle éclata sur la tête de ces malheureuses populations, ils ne volèrent pas à leur secours.

“ Le gouvernement de Louis XV commença par faire des Acadiens ses instruments, et finit par en faire des victimes.”

Ainsi, c'étaient les déportés, les persécutés, qui comme d'habitude avaient tort ; et le coupable c'était le gouvernement français, qui ne voulait pas se laisser oublier des Acadiens, et que les Acadiens n'oubliaient pas.

Le crime de la masse des Acadiens, quel était-il ? C'était de vouloir garder la neutralité entre la France et l'Angleterre, de refuser de prêter du bout des lèvres à leurs vainqueurs un serment de fidélité que leur cœur désavouait ; c'était de vouloir rester loyal à la fois au drapeau qu'ils avaient perdu et à celui qui les avait conquis.

Le crime de quelques-uns c'était de ne pouvoir se plier à un rôle de patriotes résignés, d'aller raviver sans cesse la flamme qu'ils craignaient de voir s'éteindre, de tenir sans cesse en alerte les vainqueurs, en éveil les vaincus.

L'espérance des persécuteurs, l'inquiétude des patriotes ont été trompées. L'Acadie

a survécu à la déportation en masse des Acadiens. Ramenés par l'invincible attrait du sol natal, à travers tous les obstacles, un bon nombre sont revenus à leurs foyers, les ont rétablis, et aujourd'hui l'Acadie est comme une autre Nouvelle-France.

Parkman reproche à la France deux fautes capitales :

“ La France aurait dû ériger une France protestante dans les vallées de l'ouest. Les huguenots eussent salué comme une mesure de salut la permission d'y vivre à l'ombre du drapeau français. Ils eussent arrêté la colonisation anglaise et changé la face du continent. Placer ainsi une France protestante derrière la France catholique, c'était la lui livrer.”

Parkman n'aime guère Louis XIV ; mais si peu qu'il l'aime, il doit admettre que le roi tout d'une pièce que nous présente l'histoire vaut mieux que le personnage à double rôle qu'il rêve : proscripteur de ses sujets protestants en France, leur protecteur éclairé en Amérique.

Il n'y a pas lieu de discuter la question même que soulève la révocation de l'édit de Nantes, mais à se demander si cette mesure, une fois décrétée, le grand roi pouvait ne pas l'étendre au Canada. Poser la question, c'est la résoudre. Louis XIV proscrivant les huguenots de France, comme une cause de danger pour l'Etat et de désunion entre les citoyens, ne pouvait en même temps leur ouvrir le Canada, c'est-à-dire rallumer dans la Nouvelle-France le foyer de discorde qu'il cherchait à éteindre dans l'ancienne. Les huguenots seraient arrivés sur nos rivages sous le coup de l'irritation causée par la mesure de proscription édictée contre eux, et animés du désir de se venger des catholiques. Louis XIV aurait bien vite appris ce qu'il en coûte à un souverain pour se contredire à ce point. Les reproches de sa conscience et le blâme des catholiques eussent trouvé, dans les guerres religieuses éclatant au Canada, comme au temps de la Ligue en France, une cruelle confirmation.

C'était la perte de la colonie, et non son salut, comme le prétend Parkman.

Les discordes religieuses auraient eu, dans la Nouvelle-France, des conséquences bien autrement graves que de ce côté-ci de l'Atlantique. Elle était encore trop faible pour survivre à ces déchirements qui affaiblissent et perdent souvent les Etats les plus puissants.

Les Anglais n'auraient pas tardé à avoir raison du Canada divisé.

Est-ce même aller trop loin que de penser que, dans l'entraînement de la lutte engagée entre catholiques et protestants, les protestants se fussent, à un moment donné, appuyés sur les puritains de la Nouvelle-Angleterre ? L'ennemi, aussitôt, entrerait dans la place et n'en sortirait plus.

En supposant même l'impossible, c'est-à-dire que les guerres religieuses traversant l'Atlantique à la suite des huguenots n'eussent pas eu pour conséquence de hâter la chute de la domination française, croit-on que la population, scindée en deux camps rivaux, aurait eu, après la conquête, la force de lutter, comme elle l'a fait, contre l'absorption britannique ? Les conquérants auraient recherché le concours de la population française protestante, et avec ce concours ils auraient fini par avoir raison de l'élément français catholique. Chemin faisant, ils n'auraient pas eu grand-peine, grâce à tant de sentiments et d'intérêts communs, à s'assimiler les Français protestants.

La nationalité française doit à son caractère d'unité religieuse d'être debout et intacte sur notre sol. Le Canada huguenot, c'était à la suite de la conquête le Canada anglais, ou à l'époque de la révolution américaine le Canada américain, au lieu du Canada français d'aujourd'hui.



J'arrive enfin à la dernière question posée par Parkman.

Il est d'habitude et de style ordinaire de dire que la France a abandonné le Canada, comme si, volontairement, de son plein gré, de gaieté de cœur, un beau jour, Louis XV, causant avec la Pompadour, et voulant se remettre dans les bonnes grâces de Voltaire, leur avait fait le sacrifice du Canada.

Est-ce vrai ? La France, la Cour si l'on veut, la Pompadour même si on y tient, ont-elles vraiment nourri pareil dessein ?

Etaient-elles si insensibles que cela à la gloire coloniale, à la possession d'un continent ?

Lorsque Bougainville allait demander de nouveaux secours à Versailles, et qu'on les lui refusait, les lui refusait-on par dédain des colonies, ou par impossibilité d'en donner ?

Si l'on refusait, c'est qu'on ne pouvait faire autrement ; c'est que la marine était en grande partie détruite ; l'armée tout entière occupée en Allemagne, on n'en pouvait rien détacher sous peine de la mettre en péril ; c'est ce que le maréchal de Belle-Isle disait lorsqu'il écrivait à Vaudreuil :

“ Il serait fort à craindre que les troupes de renfort ne fussent interceptées par les Anglais dans le passage ; et, comme le roi ne pourrait jamais vous envoyer de secours proportionné aux forces que les Anglais sont en état de vous opposer, les efforts que l'on ferait ici pour vous en procurer n'auraient d'autre effet que d'exciter le ministère de Londres à en faire de plus considérables pour conserver la supériorité qu'il s'est acquise dans cette partie du continent.”

C'était là la vérité absolue, navrante, qu'on pouvait contester dans l'ardeur des combats, mais qui s'imposait aux ministres. Des faits récents suppléant aux paroles étaient là pour montrer que le gouvernement était sincère. Au temps de la victoire, il avait tenu un autre langage et une autre conduite. Au lendemain de Fontenoy, la première pensée du gouvernement avait été d'organiser l'expédition commandée par le duc d'Anville et composée de onze vaisseaux de lignes portant 3,000 hommes de troupes, la plus considérable qui ait été dirigée par la France sur le Canada. Cette belle flotte fut dispersée par la tempête ; tous les vaisseaux firent naufrage. Fouquière en rallia quatre pour assiéger Annapolis ; mais une nouvelle tempête éclata sur ces débris de la flotte, et l'obligea de faire route pour la France.

Ces désastres, ces mécomptes ne découragèrent pas la Cour. Une nouvelle flotte de trente bâtiments chargés de troupes et de vivres, escortée de six vaisseaux de ligne, commandée par M. de la Fouquière, fut envoyée pour remplacer celle qui avait été perdue. Elle fut capturée en route par les Anglais, après s'être vaillamment défendue contre des forces bien supérieures.

On peut appliquer à la France les paroles que M. de Maurepas adressait à M. de la Fouquière :

“ Quand les éléments commandent, ils peuvent bien diminuer la gloire des chefs ; mais ils ne diminuent ni leurs travaux ni leur mérite.”

Le combat de Belle-Isle acheva d'écraser la marine française, et la paix d'Aix-la-Chapelle laissa la France presque sans vaisseaux.

Lors de la reprise d'une guerre qui n'avait été que suspendue, la France ne pouvait que triompher en Allemagne ; c'est là que devait porter tout son effort, dans l'intérêt même et pour le salut de son empire colonial. Vaincue sur mer, débordée en Amérique,

elle ne pouvait reprendre pied que sur le continent. Si elle eût été victorieuse, le Canada lui aurait été rendu à la paix, comme Louisbourg l'avait été à la paix d'Aix-la-Chapelle, par suite des victoires du maréchal de Saxe.

Les colonies anglaises laissaient percer, comme on l'a vu, des signes de révolte. C'était avec raison qu'au cours des négociations le duc de Choiseul pouvait dire aux Anglais : " Lorsque nous ne serons plus là pour les tenir en alarme, vos colonies vous échapperont." On aurait rendu le Canada, ou du moins une partie du Canada, pour les maintenir dans l'obéissance, par la présence de l'adversaire.

On se bornait donc à dire à Montcalm : Tenez bon, et si nous sommes victorieux le Canada sera sauvé.

Sauvé, il n'a pas été loin de l'être. La descente de Wolfe était un acte de désespoir qui a réussi.

" C'est une tentative d'un caractère si désespéré, écrivait-il à Pitt, que je ne puis ordonner à d'autres de l'exécuter." La saison tirait à sa fin, il lui fallait repartir battu ; il risqua tout, et gagna la partie. Il avait échoué à Montmorency dans des circonstances reconnues difficiles ; il pouvait échouer aux Foulons. Et alors quel désarroi, et quel dénouement différent !

Pitt, deux ans après, tombait du pouvoir, et avec lui disparaissait l'âme de la guerre, et l'un des plus redoutables ennemis de la France. Wolfe vaincu, nous résistions encore, et la diplomatie française, inspirée par le duc de Choiseul, pouvait nous sauver.

La France a succombé ; et le Canada avec elle, parce qu'elle avait devant elle deux hommes de génie, Frédéric en Prusse, Pitt en Angleterre. Elle ne pouvait plus rien pour nous. Elle s'est laissé prendre le Canada, comme, un siècle après, elle devait se laisser arracher l'Alsace-Lorraine. Lorsqu'on dit qu'elle a abandonné le Canada, on ne dit pas vrai ; elle a été vaincue, et sa main défaillante, mutilée, a laissé échapper son empire colonial, qu'elle ne pouvait plus étreindre.

C'était peut-être une faute que s'allier à l'Autriche contre la Prusse, quoique ce que nous avons vu depuis donne droit d'en douter. La conséquence de cette faute a été la perte du Canada ; mais une faute n'est pas un crime, et la défaite n'est pas un tort.

II — *Par droit chemin,*

HOMMAGE À SON HONNEUR AUGUSTE-RÉAL ANGERS, LIEUTENANT-GOUVERNEUR POUR LA PROVINCE DE QUÉBEC

*Par* PAMPHILE LEMAY.

(Lu le 25 mai 1888.)

Montcalm était tombé sur ton fier promontoire,  
Vieux Québec. Il dormait dans son linceul de gloire.  
Bien des soldats vaillants reposaient avec lui.  
Sur notre sol aimé le soleil avait lui,  
Mais l'ombre, désormais, recouvrait de son voile  
Nos champs et nos foyers. Et la dernière étoile,  
Dont tremblotaient encor les rayons incertains—  
L'espérance — mourait au fond des cieux éteints ;  
Car les Lys n'étaient plus un glorieux trophée.

La France se taisait. Une trompeuse fée  
Scellait de ses baisers la bouche de son roi.  
Les chants d'amour tuaient les cris du désarroi.  
L'iniquité des grands perdait le grand royaume.  
Nous étions revenus tour à tour sous le chaume.  
Le vainqueur menaçant s'attachait à nos pas ;  
Et nous fermions les yeux afin de ne voir pas  
Son ombre redoutable obscurcir la fenêtre.  
C'était un temps de deuil, il faut le reconnaître :  
Nous étions délaissés des "gens du vieux pays."  
Cependant notre cœur ne les a point haïs.

Or, pendant que la guerre exerce son ravage,  
A l'heure où tout s'écroule, une femme sauvage  
Sortie on ne sait d'où, d'une sombre beauté,  
Dans la ville conquise erre de tout côté.  
Comme un rameau de pin que la brise secoue,  
Et comme un voile noir qui tombe ou se dénoue,  
Sa chevelure flotte au vent, son sein bondit.  
Elle chante. On dirait un sanglot. Elle dit :

— O ma verte forêt ! ô ma forêt profonde !  
Ton silence est rompu, ton secret est trahi...

Il n'est plus de promesse où mon espoir se fonde,  
 O ma verte forêt ! ô ma forêt profonde !  
 Ah ! par son souvenir mon cœur est envahi !  
 Il me parlait d'un Dieu qui protège la femme,  
 Et met des anges bons sur ses étroits chemins.  
 L'homme blanc m'a trompée, et sa parole infâme  
 A pour jamais, hélas ! troublé mes lendemains !  
 O ma verte forêt ! ô ma forêt profonde !  
 Il n'est plus de promesse où mon espoir se fonde.

Connaître est-il un bien ? Est-ce un bien que d'aimer ?  
 Femme blanche, sais-tu comme moi la souffrance ?  
 Parler ainsi pourtant, n'est-ce pas blasphémer ?  
 Connaître est-il un bien ? Est-ce un bien que d'aimer ?  
 Il me parlait d'un ciel qui s'appelle la France.  
 Ce ciel il le vendait pour quelques pièces d'or.  
 Son cœur n'était pas droit. Il souriait aux crimes.  
 Il suivait des sentiers tortueux, cet homme. Or,  
 Le mensonge est un flot qui creuse des abîmes.  
 Connaître est-il un bien ? Est-ce un bien que d'aimer ?  
 Parler ainsi pourtant, n'est-ce pas blasphémer ?

Bois, rendez-moi l'abri de vos rameaux sans nombre,  
 Vos chants, vos fleurs. Ce monde étrange me fait peur.  
 Dans la ville des blancs je passe comme une ombre.  
 Bois, rendez-moi l'abri de vos rameaux sans nombre,  
 Je veux cacher ma honte au guerrier blanc trompeur.  
 La robe noire a mis sur mon front le baptême ;  
 Dans mon cœur trop naïf l'autre a mis le forfait.  
 Hier j'ignorais Dieu, mais j'ignorais de même  
 La vertu qu'il commande et le vice qu'il hait.  
 Bois, prêtez-moi l'abri de vos rameaux sans nombre...  
 Dans la ville des blancs je passe comme une ombre.

Cabane, lit de mousse, humble feu de fagot,  
 Mânes de mes aïeux errant sous les grands arbres,  
 Pourquoi vous ai-je fuis ?... Il se nommait Bigot !  
 Cabane, lit de mousse, humble feu de fagot,  
 Vous valiez bien des fois ses palais et ses marbres.  
 Il m'a perdue hier par de menteurs discours ;  
 Il te perd aujourd'hui dans de funestes luttes,  
 O mon pays aimé ! Nos triomphes sont courts ;  
 Pauvre Stadaconé, pleurons, pleurons nos chutes !  
 Cabane, lit de mousse, humble feu de fagot,  
 Pourquoi vous ai-je fuis ?... Il se nommait Bigot ! —

Bigot, marchand d'honneur, parvenu dont l'empire  
S'étendait sur la ville et sur les champs. Vampire  
Qui buvait notre sang et mangeait notre chair ;  
Fripon qui nous volait et nous revendait cher ;  
Bigot avait hâté, par sa filouterie,  
La honte de la France et de notre patrie.  
Il était le dernier, mais aussi le plus vil  
De tous ces affamés de plaisir, que l'exil  
Ne punit pas assez. Il laissa des ruines.  
On entrevoit encore, à travers les bruines  
Qu'un vent mystérieux traîne sur le passé,  
Son galbe de félon aux fanges du fossé.

Le temps fuit. Nous marchons, messieurs, avec vitesse.  
Ils sont bien loin déjà ces jours pleins de tristesse,  
Où, tous, nous semblions des étrangers chez nous.  
La France nous a vus, tout un peuple à genoux,  
Quand son vieux drapeau blanc, vaincu, plia son aile.  
Une plainte a monté profonde, solennelle,  
Des plaines d'Abraham où tombaient nos guerriers.  
Les traîtres de ces temps, et les aventuriers,  
Les spadassins titrés et les héros de bouge  
Par la main du bourreau sont marqués du fer rouge.  
Les méchants n'ont qu'un jour de gloire. Ils sont maudits.  
Le palais de Bigot, comme un sale taudis  
S'est écroulé là-bas. Au fond de ce repaire  
Va se cacher le loup, va siffler la vipère.  
L'hôte n'a pas changé. La fille des Hurons  
Dort son dernier sommeil aussi. Les bûcherons  
Ont rasé la forêt qui dérobait sa cendre.  
A son heure suprême a-t-elle vu descendre  
Sur son lit de rameaux l'ange saint du pardon ?

Et nous avons cent ans gémi dans l'abandon.  
Ils sont loin ces jours pleins de douleur et de honte.  
Pour instruire ses fils le père les raconte,  
Car l'exemple du mal porte parfois au bien.  
Et depuis ce temps-là, vous dirai-je combien  
Nous avons soutenu de combats ? La conquête  
A pesé lourdement, hélas ! sur notre tête ;  
Mais nous sommes debout. Nos droits nous sont rendus.  
Nous pouvons pardonner à qui nous a vendus,  
Ainsi que pardonna Joseph le patriarche.  
Vers la terre promise en silence l'on marche.  
Traversant les déserts sous l'œil de Jéhova,  
Notre peuple revient quand on croit qu'il s'en va.

La France nous sourit, la France se rappelle.  
Dans le temple superbe et dans l'humble chapelle  
Le peuple plein de foi va prier chaque jour.  
Nos bords sont devenus un glorieux séjour ;  
Nos prés ont leurs tapis d'herbe soyeuse et drue ;  
Dans le champ des aïeux conduisant la charrue,  
Le laboureur contemple en rêve les moissons.  
La chaumière du pauvre a de douces chansons ;  
La musique adorable a plus d'un interprète ;  
On dirait que, parfois, c'est le ciel qui nous prête  
Ses harpes d'or, ses luths, tous ses concerts divins.  
Le vieux monde applaudit déjà nos écrivains ;  
La France a couronné notre illustre poète.  
L'école a son savant, la chaire a son prophète ;  
Notre Eglise a son prince, incomparable honneur !  
Notre province enfin vous a pour gouverneur.

Comment la nation qu'une insolente presse  
Montrait du doigt, disant : — " La voilà ! qu'on l'opprime !  
Elle ne connaît rien que prier et servir ;  
Elle n'est qu'un troupeau ; le joug doit l'asservir ! "   
Comment la nation que, dans sa malveillance,  
Le fier vainqueur disait sans force et sans vaillance,  
S'est-elle donc, un jour, au cri de liberté  
Et de religion, levée avec fierté ?  
Ah ! c'est que la vertu régnait dans nos demeures.  
Nous attendions, messieurs, des époques meilleures,  
En priant. Nous aimions l'église et le curé.  
L'or ne nous tentait point, l'honneur était sacré.

Quand c'est le sang des preux qui coule dans les veines  
De tes enfants, ô peuple ! elles ne sont point vaines  
Tes espérances. Et tout peuple devient fort,  
Lorsque de son travail la foi soutient l'effort.  
Nous avons écouté ce que le Christ proclame :  
A César ce qu'on doit, à Dieu ce qu'il réclame !  
Le Dieu des nations nous a pris par la main.  
Homme ou peuple est béni qui va par droit chemin !

III — *Les souffrants,**Par* NAPOLEON LEGENDRE

(Lu le 25 mai 1888.)

## I

## LE CHEVAL

Le cheval, écrasé sous le pesant brancard,  
A chaque pas faisant un douloureux écart,  
Tend son col où l'on voit saigner la meurtrissure  
Sous l'angle du collier de bois.

La route est dure  
Et montante ; la charge est lourde ; il faut pourtant  
Avancer ; il s'épuise en efforts, haletant,  
Les membres ramassés, tordus, la tête basse,  
Il tire ; et l'on entend de cette informe masse  
Qui n'a presque plus rien du vaillant animal,  
Sortir un souffle creux qui râle et qui fait mal.  
Et l'homme est là, jurant et frappant sur la bête,  
A coups de pied, à coups de bâton, à la tête,  
Au ventre ; et, de la main secouant rudement  
Les rênes, fait jaillir sous le mors écumant  
Un flot de sang.

La côte est franchie, on s'arrête ;  
L'homme s'assied au bord de la route, et la bête  
Reste debout, tremblante, essoufflée, et cherchant  
A saisir, par dessus le fossé, dans le champ,  
Une motte où verdit encor quelque brin d'herbe,  
Ou quelques épis secs échappés à la gerbe ;  
Puis, regarde s'il vient encor des coups.

Enfin,  
Quand l'homme est prêt, il faut reprendre le chemin,  
Et peiner toujours tant que dure la journée...  
Et c'est ainsi d'un bout à l'autre de l'année.



Le soir, quand au cheval on ôte son collier,  
 Il se laisse attacher, rêveur, au râtelier :  
 Lui qui pourrait d'un coup de sabot briser l'homme !

— Et le beau rôle reste à la bête de somme.

## II

### LE CHIEN

Ce chien fut recueilli par un soir de décembre.  
 Il neigeait ; un feu clair chauffait l'unique chambre  
 Où vivait un petit ménage d'ouvrier.  
 L'homme était revenu tard de son atelier,  
 Et la femme achevait de desservir la table.  
 Tout à coup, on entend un long cri lamentable,  
 Un hurlement, auquel se mêle, dans la nuit,  
 Des voix d'enfants, des chocs de cailloux ; et le bruit  
 Se rapproche ; alors l'homme entre-bâille la porte,  
 Et, pendant que s'élève une clameur plus forte,  
 Un chien, d'un bond, s'en vient rouler près du foyer,  
 Effaré, tout sanglant, tâchant d'apitoyer  
 Par un regard craintif et qui demande grâce.  
 La porte se referme et le chien prend sa place  
 Dans cette humble maison où le sort l'a jeté.  
 — Le pauvre, ayant souffert, comprend la charité ;  
 Et, lorsque le malheur lui demande assistance,  
 Ce qu'il secourt en lui, c'est sa propre souffrance.

Un an se passe.

Un jour — c'est pendant la moisson —  
 Tout le monde est aux champs ; le feu dans la maison  
 Eclate tout à coup. L'homme est à son usine,  
 La femme cause dans quelque maison voisine.  
 On entend craqueter le plafond ; un rideau  
 De fumée a déjà couvert le toit ; pas d'eau :  
 La mer, basse, est à plus d'un mille du rivage.  
 Un homme seul travaille à sortir le ménage ;  
 Le feu monte... Un cri part, soudain : " Sauvez l'enfant ! "  
 ...Mais voici qu'au milieu du nuage étouffant,  
 On voit un chien bondir à travers la fenêtre.  
 Quelques secondes... puis on le voit reparaitre,  
 Dans sa gueule tenant par son linge accroché  
 Le petit qu'à la mort il avait arraché.  
 Il vient le déposer sur le gazon.

La bête

Au péril de sa vie avait payé sa dette.

## III

## ORPHELIN

J'allais passer le coin d'une ruelle sombre,  
Quand j'entendis monter un son plaintif dans l'ombre,  
Et je vis, sur le seuil d'une porte, un enfant  
Assis, le front penché, tête nue, étouffant  
Les pleurs qui soulevaient sa poitrine oppressée.  
A ses côtés gisait une cruche brisée.  
J'avancai ; quand je fus près, je sentis du sol  
Monter vers moi l'odeur âcre de l'alcool  
Qui marbrait de tons bleus les trous noirs de la boue.  
Et l'enfant, essuyant les larmes de sa joue,  
Me regarda d'un air craintif, prêt à s'enfuir :  
— Car ces pauvres toujours craignent de voir venir  
Des coups, ou bien la main lourde de la justice ;  
Leur œil a comme un flair lointain de la police.

Je lui parlai, ma voix sembla le rassurer ;  
Et j'appris le malheur qui le faisait pleurer.  
Hélas ! c'était encor le récit ordinaire :  
Ses parents étaient morts, l'an passé, de misère ;  
Il était resté seul, petit, ne sachant rien  
Que souffrir et pleurer. Un vieil Italien  
L'avait, un soir, trouvé grelottant dans la rue,  
Et, tâchant d'adoucir un peu sa voix bourrue,  
En lui parlant, l'avait conduit à son logis.  
Et le petit, alors, sécha ses yeux rougis,  
Croyant, avec la foi naïve de l'enfance,  
Que la voix qui venait lui rendre l'espérance  
Était la voix de Dieu même.

Le lendemain,  
Il lui fallut partir, aller tendre la main,  
Avec d'autres enfants comme lui, par la ville ;  
Puis, le soir, rapporter au nouveau domicile  
Tout l'argent qu'on avait donné. S'il arrivait  
Que la somme fût trop petite, on les privait  
De pain, on les battait au sang, à coups de corde,  
— Afin, disait le vieux, que la miséricorde  
Des passants soit touchée en les voyant ainsi  
Saigner ! — Puis, ils montaient au grenier ; et ceci  
Allait se répétant chaque jour, et sans trêve.  
Et, devant le soleil glorieux qui se lève,

Ils marchaient, les regards éblouis de rayons,  
 Et, le cœur plein de nuit, pleurant sous leurs haillons.  
 Le vieux, grâce au travail des enfants, pouvait vivre  
 Tranquille ; et, tous les jours, les ayant battus, ivre,  
 S'endormait sans entendre, au fond du grenier noir,  
 Les voix qui gémissaient dans l'air glacé du soir.

Ce jour-là, la recette avait été très-bonne ;  
 Les enfants avaient l'air si tristes que personne  
 Presque ne leur avait refusé. Le vieillard,  
 Sans les battre, à chacun avait donné sa part  
 De pain noir ; et, sentant sa soif inassouvie,  
 Il envoya remplir sa cruche d'eau-de-vie.  
 Et c'était cet enfant que le maître attendait,  
 Et qui, dans son malheur pleurait et s'attardait,  
 N'osant franchir le seuil de la terrible porte.

— Je ne sais s'il est bien d'en agir de la sorte,  
 Et s'il faut calculer à l'avance l'effet  
 De l'acte, quand la main s'ouvre pour le bienfait ;  
 S'il faut peser la part du malheur et du crime,  
 Et songer que ce qui sauve cette victime  
 Va tout à l'heure aider cet homme à s'enivrer ;  
 Je ne pris pas le temps de bien considérer,  
 Et je donnai ma bourse à l'enfant.

Ah ! pardonne,

Si cette charité, Seigneur, ne fut pas bonne ;  
 Mais, lorsqu'un enfant pleure, il me semble, ô mon Dieu,  
 Qu'un nuage de deuil monte sur ton ciel bleu !

#### IV

##### PAUVRES

La devanture des boutiques  
 S'illumine de reflets clairs,  
 Qui jettent leurs teintes fêériques  
 Sur les volets tout grands ouverts.  
 L'or et les émaux étincellent  
 A l'étalage du comptoir ;  
 Les colliers de perles ruissellent  
 Près des broches en jaspe noir.

Ici des grappes d'émeraudes  
Mèlent leurs clignotements lourds ;  
Et les rubis aux teintes chaudes  
Chargent les écrins de velours.  
Par là, les changeantes opales,  
Comme en un rêve souriant,  
Font miroiter sur leurs fronts pâles  
Les tons roses de l'Orient.

Plus loin, dans un coin baigné d'ombre,  
Les diamants — ces demi-dieux —  
Laissent rayonner leur feu sombre  
D'un air calme et mystérieux.  
Ils s'isolent, loin du vulgaire,  
Comme les astres au front pur  
Entre eux et l'ardeur de la terre  
Mettent les plaines de l'azur.

Là-bas, le marbre et les albâtres  
Offrent leurs séduisants contours ;  
Bergers et bergères folâtres  
Donnent la main à des Amours ;  
Et, dans des chambrettes exquises,  
Sur des tapis de velours fin,  
Des marquis avec des marquises  
Dansent sous le loup de satin.

La valse onduleuse soupire  
Et traîne ses pas languissants ;  
Sur les consoles de porphyre  
Les lustres penchent, jaunissants.  
Il flotte dans cette atmosphère  
Une inquiétante torpeur ;  
Une ivresse molle et légère  
Respire dans chaque lueur.

C'est la nonchalante accalmie  
Des spectacles amollissants ,  
C'est la vision endormie  
Qui grise l'âme par les sens.  
Il semble que le Temps lui-même,  
Charmé, suspende son essor,  
Et qu'au cadran noir, l'Heure blême  
Dorme sur les aiguilles d'or.

Et, pendant que la foule passe  
Parmi ces reflets chatoyants,  
Deux tout petits enfants, en face,  
Regardent de leurs yeux brillants.  
Ils sont là, sur le sol humide,  
Sans se soucier du froid noir,  
Contemplant le décor splendide  
Qui leur apparaît du trottoir.

Ce ne sont pas les pierres fines  
Que dévore leur œil jaloux ;  
Pour eux, tout l'attrait des vitrines  
Est dans les jouets de deux sous :  
C'est le petit polichinelle  
Avec sa tête de bois peint,  
La poupée en coton, si belle,  
Dans son bercelet de sapin !

Ils sont là ; les heures se passent,  
La nuit vient, le froid est plus vif ;  
Mais jamais leurs yeux ne se lassent  
Dans leur étonnement naïf.  
— Vous qui courez, foule frivole,  
Prodiguer votre or au plaisir,  
N'aurez-vous donc pas une obole  
Pour combler cet humble désir ?

Dieu donne à l'astre sa lumière,  
Et l'astre, — écoutant le Seigneur, —  
Verse ses rayons sur la terre  
Au calice de l'humble fleur.  
— Dieu vous a donné l'opulence  
Pour que, sur le bord du chemin  
Si vous rencontrez l'indigence,  
Riches, vous lui tendiez la main !

IV — *Eclaircissements sur la Question Acadienne,*

Par L'ABBÉ H.-R. CASGRAIN.

( Lu le 24 mai 1888.)

## LE SERMENT D'ALLÉGEANCE.

“ Il est très remarquable, dit Haliburton, dans son *Histoire de la Nouvelle-Ecosse*, de voir qu'on ne trouve aucune trace de cet événement important (la dispersion des Acadiens) dans les archives du secrétaire d'Etat d'Halifax. Je n'ai pu découvrir que la correspondance ait été conservée, ni que les ordres, retours et mémoires y aient été gardés... Les détails de cette affaire semblent avoir été soigneusement cachés, quoiqu'il ne soit point maintenant facile d'en trouver la raison, à moins que les auteurs de cette transaction n'aient eu honte de leur acte, comme au reste ils le devaient.”<sup>1</sup>

Ce passage de Haliburton a donné lieu à de vives réclamations de la part de quelques écrivains anglais. Ils ont soutenu que Haliburton s'était trompé, que rien n'avait été détruit ni caché, et que, si ses recherches étaient restées infructueuses, c'est qu'alors les documents étaient enfouis dans des greniers où ils avaient été oubliés.

Quoi qu'il en soit, les pièces existantes étaient classifiées en 1860, lors du voyage que fit M. Rameau à Halifax en vue de mettre la dernière main à son *Histoire d'une colonie féodale*. L'archiviste d'alors semblait avoir pris à tâche d'éveiller les soupçons du public.

“ J'arrivai en septembre à Halifax, m'écrivit M. Rameau ; mon ami, M. Beamish Murdoch, m'obtint la permission de consulter les archives du gouvernement, et on m'assigna un rendez-vous pour le lendemain. Je me présentai à l'heure dite : on me montra sur une table un certain nombre de registres et de volumes ; mais on me prévint qu'il m'était interdit d'en prendre aucune copie ni extrait. En conséquence, je ne devais avoir ni papier, ni plume, ni crayon. On me plaça près d'une table qui était au milieu d'une salle dans laquelle travaillaient huit ou dix commis ; on ne me donna aucun siège, afin que je ne pusse pas m'asseoir, et qu'aucun de mes mouvements ne pût échapper aux employés.

“ Voilà dans quelle condition j'ai pu consulter les archives pendant les huit ou dix jours que j'ai passés à Halifax.

“ Je vous avoue que cette manière de faire me rappela involontairement ce que raconte Haliburton à propos des mécomptes qu'il avait éprouvés lui-même, en consultant ces

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<sup>1</sup> It is very remarkable, that there are no traces of this important event to be found among the records, in the Secretary's Office of Halifax. I could not discover that the correspondence had been preserved, or that the orders, returns and memorials had ever been filed there... The particulars of this affair seem to have been carefully concealed, although it is not easy to assign the reason, unless the parties were, as in truth they well might, be ashamed of the transaction.”

*Haliburton's Nova Scotia*, vol. I, p. 196.

mêmes archives, et aussi les soupçons qui lui vinrent à l'esprit, sur la honte que l'on pouvait éprouver à communiquer certains papiers qui auraient dû s'y rencontrer, et qu'il n'y trouva pas. J'ai remarqué comme lui les lacunes qui existaient à certaines époques dans ces archives ; lacunes que les extraits publiés à Halifax en 1869 n'ont pas comblées. Peut-être, du reste, pourrait-on trouver dans d'autres dépôts publics, des doubles de quelques-unes des pièces qui manquent à Halifax...

M. Rameau n'est pas le seul à qui des doutes soient venus en parcourant le volume d'*Archives de la Nouvelle-Ecosse* publié par le gouvernement de cette province sous la direction de M. Aikins ;<sup>1</sup> et c'est précisément pour éclaircir ces doutes que je me suis rendu à Londres, au cours de l'hiver dernier, afin d'y faire des études comparatives au *Public Record Office* et au *British Museum*. Je dois dire tout d'abord que la facilité avec laquelle on a accès à ces archives forme un contraste frappant avec le système de défiance établi à Halifax. Je dois ajouter ensuite que j'ai acquis la preuve que nos soupçons n'étaient que trop fondés.

Le *Choix des Documents* publiés à Halifax a été évidemment fait en vue de justifier le gouvernement de la Nouvelle-Ecosse de la déportation des Acadiens. Pour cela on a éliminé systématiquement et laissé dans l'ombre les pièces les plus compromettantes, celles qui pouvaient le mieux établir les droits des Acadiens. Qu'on remarque bien que le compilateur de ce volume n'a pas le droit de plaider ignorance, car il indique lui-même en plusieurs endroits qu'il a étudié les pièces officielles du *Public Record Office*, afin de les confronter avec celles d'Halifax.

J'ai confronté à mon tour la compilation d'Halifax avec les originaux du *Public Record Office*, et j'ai constaté des omissions considérables et tellement essentielles qu'elles changent complètement la face des choses. J'ai fait transcrire et collationner avec soin les pièces omises, et je m'en suis servi pour établir, sous son vrai jour et dans une lumière qui n'a jamais été connue jusqu'à présent, la question la plus importante de toute l'histoire de l'Acadie, celle du serment d'allégeance, qui a été le pivot sur lequel ont roulé toutes les difficultés et qui a fini par amener la dispersion des Acadiens. Afin de ne rien négliger de ce qui pouvait éclaircir cette question, j'ai fait copier à Paris tous les documents relatifs à l'Acadie qui se trouvent aux Archives des différents ministères. J'ai pu par ce moyen mettre en regard les témoignages des deux parties, ceux des Anglais d'un côté, ceux des Français de l'autre, les compléter les uns par les autres, et en faire ressortir la vérité des faits avec une surabondance de preuves qui n'admet pas de doute. C'est le résultat de ce travail que je sou mets aujourd'hui à votre attention.<sup>2</sup>

## I

On a peine à réprimer un mouvement d'irritation contre la France en songeant avec quelle insouciance elle a abandonné l'une après l'autre ses belles colonies d'Amérique. Après l'Acadie est venu le Canada ; après le Canada, la Louisiane. De ce vaste continent dont elle possédait les trois quarts, il ne lui reste plus que les petits rochers de Miquelon.

L'Acadie fut la première sacrifiée : c'était la plus ancienne, peut-être la plus intéres-

<sup>1</sup> *Selections from the Public Documents of the Province of Nova Scotia.* Halifax, 1869, 1 vol. in-8o, 765 pages.

<sup>2</sup> Les autres questions feront le sujet d'études séparées.



sante, certainement la plus importante, si l'on considère les conséquences de son abandon. On livrait par là les avant-postes à l'ennemi ; et on lui laissait de ce côté les frontières ouvertes, préparant ainsi fatalement la conquête du Canada.

Et puis, de quel vaillant petit peuple la France se désintéressait en cédant l'Acadie ! Et cela au lendemain de la lutte incomparable que ce peuple venait de soutenir pour rester français !

Trois fois de suite, dans l'espace de quatre ans (de 1704 à 1707), il avait repoussé, devant les murs croulants de Port-Royal, des forces trois ou quatre fois plus nombreuses que les siennes.

Enfin son dernier commandant, l'intrépide Subercase, assiégé de nouveau en 1710 par une armée de trois mille quatre cents hommes, c'est-à-dire plus nombreuse que la population tout entière de l'Acadie, n'avait cédé qu'après avoir fait une résistance héroïque, et obtenu la capitulation la plus honorable. La petite garnison, qui ne comptait pas deux cents hommes, était sortie du fort tambour battant, arme au bras, drapeau déployé au vent. Sa résistance avait paru d'autant plus surprenante au général Nicholson que cette poignée d'hommes était si dénuée de tout, si déguenillée, qu'on l'eût prise plutôt pour des mendiants que pour des soldats. Tel était l'état d'abandon dans lequel la France avait laissé les derniers défenseurs de l'Acadie.

Par le traité d'Utrecht conclu en 1713, l'Acadie fut cédée définitivement à la Grande-Bretagne, et les colons français de cette province, qui reçut alors le nom de Nouvelle-Ecosse, passèrent sous la couronne de l'Angleterre. Mais, par une clause spéciale du traité, "il était expressément convenu qu'ils avaient la liberté de se retirer ailleurs, dans l'espace d'un an, avec tous leurs effets mobiliers... Que ceux néanmoins qui voudraient y demeurer et rester sous la domination de la Grande-Bretagne, devaient jouir de l'exercice de la religion catholique et romaine, autant que le permettaient les lois de la Grande-Bretagne."

Peu de jours après la signature du traité (11 avril 1713), la reine Anne, ayant appris qu'à sa demande le roi de France avait accordé la liberté à des prisonniers détenus aux galères pour cause de religion, voulut lui en témoigner sa satisfaction en octroyant aux habitants français de la Nouvelle-Ecosse des conditions plus favorables que celles qui étaient stipulées dans le traité. Elle fit adresser, en conséquence, au général Nicholson, gouverneur de la Nouvelle-Ecosse, une lettre dans laquelle elle lui donnait des ordres qu'il est important de citer textuellement : " Vous permettrez, y disait-elle, et allouerez à ceux de ses sujets (du roi de France) qui ont des terres et des emplacements en notre gouvernement d'Acadie, qui ont été ou qui sont attachés à nous en vertu du dernier traité de paix, et sont dans la volonté de devenir nos sujets, de retenir et posséder les dites terres et emplacements sans aucun paiement, loyers ou troubles quelconques, aussi pleinement ou abondamment et librement que nos autres sujets font ou peuvent posséder leurs terres et biens, ou de les vendre s'ils aiment mieux se retirer ailleurs." <sup>1</sup> En présence d'ordres aussi formels, il semble que le gouverneur de la Nouvelle-Ecosse n'aurait dû songer qu'à les exécuter. Il n'en fit rien cependant ; et ce fut là le commencement des infidélités commises par des subalternes qui ne devaient être que trop imités plus tard et devaient finir par consommer la ruine des malheureux Acadiens.

Dès que ceux-ci eurent appris que leur pays avait été cédé définitivement à l'Angleterre,

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<sup>1</sup> *Archives des Affaires Etrangères*, Paris.

ils avaient résolu unanimement de l'abandonner et d'aller se réfugier soit à l'île Royale, soit à l'île Saint-Jean. Ils étaient d'autant plus portés à prendre ce parti que, d'une part, le gouvernement français, voulant les attirer à l'île Royale, leur offrait des secours pour s'y transporter avec leurs effets et s'y établir; et que, de l'autre, ils avaient à se plaindre des procédés du général Nicholson. Au reste, la conduite de ce gouverneur n'avait pas soulevé moins de mécontentement parmi les Anglais qu'il commandait à Port-Royal, que parmi les Acadiens. "Nous espérons, écrivait l'un d'eux, qu'à son arrivée le gouverneur paierait la garnison, et mettrait la place sur un bon pied; mais au contraire il nous a jetés dans la plus grande confusion. Il a renversé les fortifications, mis dehors les Français, et chassé tous les Anglais, de façon que la place est presque déserte. En un mot, si ses ordres avaient été de ruiner le pays, il n'aurait pu agir mieux qu'il n'a fait."<sup>1</sup>

De son côté, le colonel Vetch mandait aux lords du commerce :

"Je crois de mon devoir d'avertir vos seigneuries, en vue du bien public, de l'état où se trouve le pays de la Nouvelle-Ecosse... Les habitants français sont en quelque sorte forcés de quitter le pays par suite des traitements qu'ils ont reçus de M. Nicholson."<sup>2</sup>

Nicholson s'était flatté que les Acadiens n'abandonneraient pas facilement les fertiles terres qu'ils occupaient; aussi fut-il surpris autant que déconcerté en apprenant qu'après avoir mûrement délibéré, en assemblées publiques, sur le parti qu'ils avaient à prendre, ils avaient résolu unanimement de partir sans délai. Ils lui avaient signifié leur résolution par leurs députés, et, joignant l'action à la parole, ils s'étaient mis immédiatement à construire des bateaux et des chaloupes pour se transporter avec leurs familles, leurs bestiaux et leurs effets.

Les conséquences d'une telle détermination étaient fatales pour la nouvelle province que Nicholson s'enorgueillissait d'avoir conquise pour l'Angleterre. Elle perdait par là l'importance qu'on y attachait.<sup>3</sup> En effet, les Français partis, la Nouvelle-Ecosse n'était

<sup>1</sup> *Extract of a letter from Mr. Adams to Capt. Steele, Jan. 24th, 1714-15.* — Voir à la fin de cette conférence Doc. INÉDITS, no I. — Pièce omise dans le volume d'*Archives de la Nouvelle-Ecosse* publié à Halifax.

<sup>2</sup> *Letter from Col. Vetch to the Board of Trade, March 9th, 1714-15.* — Voir Doc. INÉDITS, II. — Pièce omise dans le volume d'*Archives de la Nouvelle-Ecosse* publié à Halifax.

<sup>3</sup> "Les sauvages des missions françaises des costes de l'Acadie sont ennemis si irréconciliables de la nation anglaise que toutes nos harangues les plus pacifiques ne peuvent leur imprimer de ne point troubler son commerce; ils pillent et ont pillé plusieurs de leurs bâtiments, empêchent (de pêcher) dans les havres de ladite coste de l'Acadie. Un vaisseau de douze à quatorze canons s'étant perdu sur une petite île dans la baie française, Saint-George, duquel les équipages se sauvèrent à terre avec la plus grande partie de leurs marchandises, lesdits sauvages y ont abordé au nombre de vingt hommes armés et se sont rendus maîtres de tout ce qu'ils ont pu emporter avec eux, après en avoir chassé les dits... équipages anglais, desquels ils ont même tué un homme et lorsqu'on leur a demandé la raison qui les oblige de tuer des gens qui ne se défendaient point, ils ont répondu que c'était pour faire peur aux autres et, pour autoriser leur violence, ils disent que tous les sauvages de leur nation meurent aux Mines et que c'est par un poison que les Anglais leur ont donné; le sieur Gaulin les a menacés de ne plus les confesser s'ils ne restituaient leurs pillages. Cela ne leur a imprimé aucun scrupule de conscience: bien au contraire ils lui ont dit qu'ils ne lui demanderaient jamais rien. Je vous assure, Monseigneur, que ce sont là des animaux bien difficiles à conduire. J'ai écrit à leur chef tout ce que je devais sur ce sujet par la voie de M. Gaulin. J'aurai l'honneur d'envoyer la copie de ma lettre à Votre Grandeur pour qu'elle s'aperçoive que je ne néglige rien de ce qui doit calmer la férocité de ces peuples."

"DE COSTEBELLE."

"Au Port-Dauphin, le 9<sup>me</sup> 7<sup>bre</sup> 1715."

*Archives de la Marine et des Colonies, île Royale. Correspondance générale. Lettre au Conseil de Marine, années 1712-1716, vol. I, fol. 128, verso.* — Ces rapports du Conseil de Marine portent pour signatures :

L. A. DE BOURBON,

LE MARÉCHAL D'ESTRÉES.

Louis-Alexandre de Bourbon, comte de Toulouse, était le troisième fils légitimé de Louis XIV et de M<sup>me</sup> de Montespan. Il occupait la présidence du Conseil de Marine en qualité d'amiral de France.

plus qu'un désert hanté par des tribus sauvages, ennemis traditionnels et irréconciliables des Anglais. Port-Royal, la seule place fortifiée et dont la subsistance dépendait des colons, serait forcément abandonnée.<sup>1</sup>

Nicholson ne le comprit que trop, et, pour éviter ce désastre, il ne craignit point de violer le traité de paix et de désobéir ouvertement aux ordres de sa souveraine. Il mit les Acadiens dans l'impossibilité de vendre leurs terres et leurs effets, en défendant aux Anglais, de rien acheter d'eux. Il interdit l'accès des ports aux navires français qui devaient leur apporter les agrès nécessaires aux embarcations qu'ils avaient construites ; il leur fit défense d'écrire à Boston pour en faire venir ; il alla jusqu'à faire saisir leurs bateaux et leurs chaloupes. En un mot, il les retint prisonniers chez eux, comme devait le faire plus tard le misérable Lawrence avant de les disperser aux quatre coins du ciel.<sup>2</sup>

En même temps il chercha à les séduire par les promesses les plus flatteuses, leur offrant, s'ils voulaient rester, les mêmes droits et privilèges qu'avaient les sujets anglais.<sup>3</sup> Ce fut lui également qui inaugura à l'égard des missionnaires des Acadiens le système de vexations dont ils eurent tous plus ou moins à souffrir dans la suite. Ces prêtres étaient les seuls hommes instruits qu'il y eût parmi eux, et par conséquent les mieux en état de les éclairer. Nicholson leur fit défense de se mêler en rien de leurs affaires et de leur donner des conseils, comme si leur qualité de prêtres leur enlevait les titres de citoyens et de Français, et les privait du droit de donner à des compatriotes placés dans les circonstances les plus difficiles, des avis que ceux-ci leur demandaient. Le but de ces défenses était évident : c'était de mieux profiter de l'ignorance des Acadiens laissés à eux-mêmes, et de surprendre plus facilement leur bonne foi.

Les missionnaires durent se soumettre, du moins extérieurement, à ces prescriptions iniques, de crainte d'être bannis et de voir leurs ouailles privées de secours spirituels. Les Acadiens eurent alors recours au gouverneur du Cap-Breton, M. de Costebelle, et le prièrent d'envoyer quelqu'un de ses officiers à Port-Royal pour plaider leur cause et faire exécuter le traité. M. de Costebelle, à qui la cour de France avait recommandé de favoriser l'exode des Acadiens, dépêcha immédiatement de Louisbourg deux hommes de confiance, les capitaines De la Ronde et Pinsens, qui furent munis d'instructions, dont il importe de connaître le texte.

" Il (M. de la Ronde) s'embarquera dans le bateau du roy le *Saint-Louis* pour aller au Port-Royal.

<sup>1</sup> " ... In case ye French quit us we shall never be able to maintain or protect our English families from ye insults of Indians, ye worst of enemies, which ye French by theirs staying will in a great measure wend off, for their own sakes. — *Nova Scotia Archives. Lt. Govr. Caulfield to Board of Trade and Plantations*, p. 9.

<sup>2</sup> *Lettre de M. de Saint-Ovide de Brouillan à M. John Doucet, gouverneur de la Nouvelle-Ecosse*. Louisbourg, 21 juillet 1718. — Voir Doc. INÉDITS, XIII. — Pièce omise dans le volume d'*Archives de la Nouvelle-Ecosse* publié à Halifax.

" ... They had built abundance of small vessels to carry themselves and effects to Cape Britton. *Pub. Record Office. Letter from Sam. Vetch to Board of Trade*, Sept. 2<sup>nd</sup>, 1715. — Voir Doc. INÉDITS, VII. — Pièce omise dans le volume d'*Archives* publié à Halifax.

" ... Le sieur de Capon lui ayant dit (à M. de Costebelle) qu'ils n'étoient arrivés aucuns nouveaux ordres de la Cour d'Angleterre pour lever les difficultés que le général Nicholson fit en 1714." *Conseil de Marine*, 28 mars 1716.

<sup>3</sup> M. Nicholson leur a fait dire que ceux qui voudraient rester sur leurs terres jouiront des mêmes privilèges que les sujets de la Reine et que si leurs prêtres ne vouloient pas rester que la Reine leur en enverroit d'Irlande ; ce qui est sûr, c'est qu'on ne doit rien épargner pour que ces habitants sortent, il est très sûr que s'ils sortent, les Anglais ne peuvent garder l'Acadie ; la permission de la Reine ne sert de rien ; il est défendu aux Anglois de rien acheter. — *Lettre du major L'Hermite au Conseil de Marine*, 29 août 1714.

“ Il mettra en passant les habitans des Mines à terre à Chibouctou qui s'en iront au travers les terres, ensuite il continuera sa route.

“ Etant arrivé au Port-Royal si M. Nicholson n'étoit point arrivé, il l'attendra ; il luy remettra ma lettre et l'informerá du sujet de son voyage, — conformément à la lettre que je luy écris dont je luy en donne copie.

“ Il s'embouchera avec le père Bonaventure et les autres missionnaires, prendra langue d'eux de ce qui se passe et agira de concert avec eux tant pour l'évacuation des habitans que pour qu'il soit permis à ceux qui ne pourront pas évacuer cette année de rester jusqu'à l'année prochaine, vu qu'ils ont un an à se retirer et qu'on les en a empêchés jusqu'à présent, par conséquent l'année ne doit commencer que du jour que la permission leur en sera donnée ; en cas qu'on luy fasse des objections sur ces articles il a les ordonnances de la Reine sur lesquelles il se doit régler et demander à M. Nicholson de les faire exécuter, il doit prendre garde de ne se point relâcher sur aucun article.

“ Il sait que par l'article 14 du traité de paix qu'il est permis à ces habitans de sortir avec leurs effets mobiliers qu'ils pourront emporter, par conséquent les bateaux, chaloupes et bestiaux y sont compris.

“ Par le dernier traité il leur est permis de vendre les autres biens immobiliers, ainsy ils ne peuvent les empêcher de se retirer sans vouloir aller contre les volontés de la Reine ; il fera agir les missionnaires pour représenter à ces habitans les périls où ils se trouvent en demeurant avec les Anglois qui dans la suite les regarderont comme leurs esclaves quand même ils changeroient de religion.<sup>1</sup> Il donnera avis de son arrivée au père Bonaventure et au père Félix par le moyen des habitans des Mines ou autres s'ils s'en trouvent au Port-Royal ; il ne s'absentera point du Port-Royal à moins que pour des raisons fortes

“ Il fera agir les missionnaires à l'égard des habitans sans qu'il paroisse d'affectation. de son côté, il fera seulement connoître qu'il n'est là que pour soutenir le droit des habitans et le privilège qu'il a plu au roy leur procurer de la reine d'Angleterre et pour leur faciliter une retraite sous l'obéissance de leur roy.

“ Après que toutes choses seront réglées, il fera un état général de ceux qui auront des bateaux ou qui en feront, s'ils restent cet hiver ; et de ce qu'ils auront besoin pour les faire naviguer et dans quel temps ils en auront besoin. Il en fera pareillement un, du nombre des familles qui n'auront point de voiture et de ce qu'ils peuvent avoir à apporter, il observera de marquer le temps qu'ils pourront sortir...

“ En cas qu'il se trouve d'autres obstacles je lui laisse à sa prudence ; il fera part de tout ce que je lui dis au père Justinien qui pourroit l'éclaircir sur d'autres sujets qui ne sont point à mes connaissances.”<sup>2</sup>

MM. de la Ronde et Pinsens arrivèrent à Port-Royal au cours de l'été de 1714. M. Nicholson leur fit bon accueil, leur permit de faire des assemblées et de s'aboucher avec les Acadiens, qui tous unanimement réitérèrent leur ferme détermination d'évacuer le

<sup>1</sup> Le gouverneur de Louisbourg ne parlait ainsi que parce qu'il savait ce qui se passait alors dans les colonies anglaises. La haine contre les Français y était encore plus forte que le fanatisme religieux. En 1700 le village de Frenchtown, dans le Rhode Island, composé de huguenots français qui s'y étaient réfugiés après la révocation de l'édit de Nantes, fut assailli par la population du voisinage, les maisons furent envahies, leurs habitants horriblement maltraités et obligés de fuir uniquement parce qu'ils étaient coupables d'être français. Vers le même temps et pour le même motif, les huguenots français établis dans les Etats du sud, s'y étaient vus molestés au point qu'ils avaient résolu d'abandonner le pays. Ils avaient même fait des démarches pour aller se fixer en Louisiane.

<sup>2</sup> Fait au hâvre Louisbourg, le 11 juillet 1714. L'Hermite. — *Extrait des Archives du Conseil de Marine.*

pays. Nicholson parut convenir de tout, mais finit par tout refuser en donnant pour prétexte qu'il fallait recourir à la reine d'Angleterre pour obtenir une nouvelle décision. On se refuserait à croire à de pareils subterfuges, si l'on n'avait sous les yeux les pièces officielles qui le prouvent.<sup>1</sup>

L'hiver, durant lequel les Acadiens ne pouvaient émigrer, serait venu avant le retour de la prétendue réponse qui, du reste, n'arriva jamais : c'était tout ce que cherchait Nicholson.

L'année suivante, Nicholson était parti. La Nouvelle-Ecosse avait pour lieutenant-gouverneur le colonel Vetch. Cet officier, qui n'avait pas eu de termes assez violents pour censurer la conduite de son prédécesseur, ne respecta pas plus que lui la foi des traités, et mit les mêmes obstacles au départ des habitants.<sup>2</sup>

Les naïfs Acadiens, si honteusement bernés par Nicholson, s'attendaient si bien à partir dans le cours de 1715, qu'ils n'ensemencèrent pas leurs terres au printemps de cette

<sup>1</sup> "En 1714, les sieurs de la Ronde et Pinsens, capitaines, furent envoyés à l'Acadie pour obtenir de M. de Nicholson une liberté pour les François de l'Acadie de se retirer avec leurs bestiaux et leurs grains à l'île Royale

"M. de Nicholson permit à ces officiers de faire assembler les habitants pour savoir leurs intentions. Ils déclarèrent tous qu'ils voulaient retourner à leurs souverains. Il fut demandé à M. Nicholson que conformément à l'article quatorze du traité de paix, ces habitants eussent l'espace d'une année pour rester sur leurs biens sans empêchement.

"Qu'il leur fut permis pendant ce temps de transporter leurs grains et leurs bestiaux, de construire des bâtiments pour le transport de leurs effets et de recevoir de France les agrès et les appareils pour ceux qui seroient bâties au Port-Royal ou ailleurs.

"*Ces deux articles furent renvoyés à la décision de la reine.* On demanda encore qu'il leur fut permis de vendre leurs habitations ou de laisser procuration.

"Il fut répondu à cet article *remis à la reine*, de plus renvoyé à sa lettre qui en doit être un sûr garant.

"M. de Nicholson promit en outre une prompte expédition de tous ces articles... MAIS DEPUIS CE TEMPS ON N'A EU AUCUNE RÉPONSE SUR CE SUJET. — *Conseil de Marine*, 28 mars 1716.

"... Il n'avait pas tenu à eux (les Acadiens) qu'ils ne se fussent retirés en 1714, mais la porte leur avait été fermée par le refus du général Nicholson." — *Conseil de Marine*, 23 mai 1719. *Rapport du P. Dominique de la Marche.*

Le rapport suivant adressé au Conseil de Marine, à Paris, fait voir que M. de Costebelle prévoyait les difficultés que ferait le général Nicholson au départ des Acadiens :

"Le 13 juillet je fis partir M. de la Ronde Denis pour le Port-Royal, dans un bateau de l'Acadie que j'avois frété. J'envois à Votre Grandeur la copie de la lettre que j'ai écrite à M. de Nicholson, et des instructions que j'ai données à M. de la Ronde. Je lui ay remis les ordres de la Reine en anglois et en françois. M. Gaulin s'embarqua avec luy et plusieurs Acadiens qui étoient ici. J'ai cru, Monseigneur, de ne pas rendre un plus grand service au Roy que d'aider à ces habitans à sortir d'un abîme où ils vont tomber.

"Votre Grandeur me dit qu'elle envoyoit pour eux les agrès que j'avois demandés ; mais ils viendront tard ; avant qu'on les leur ait fait tenir la saison sera bien avancée. *Ils avoient écrit à Boston pour en avoir ; M. de Nicholson l'a défendu, même a fait arrêter leurs bateaux et chaloupes qu'ils avoient bâtis.* Ils m'ont paru être dans le sentiment de ne pas sortir qu'ils n'aient vu la décision de M. Nicholson. *Il est constant qu'il fera tout ce qu'il pourra pour les retenir : ils ont même tenu déjà deux fois conseil pour quitter le Port-Royal... c'est en partie ce qui m'a déterminé à y envoyer, d'autant plus que les Anglois les ont mis hors d'état de pouvoir subsister, s'ils ne recueillent pas leurs récoltes en achetant leur blé.*" — *Lettre du Major L'Hermite*, 29 août 1714.

<sup>2</sup> "Ayant appris, Monsieur, par plusieurs habitants du Port-Royal, des Mines et de Beaubassin que celui qui commande à votre absence au Port-Royal (le colonel Vetch), leur a fait défense de sortir, et même en a refusé la permission à ceux qui lui ont demandés, ce qui fait que les habitants qui seraient maintenant établis sur les terres du Roi, se trouvent la plupart hors d'état de se retirer cette année..."

"C'est ce qui m'a déterminé, Monsieur, suivant l'ordre que le Roi m'en donne, d'y envoyer M. de la Ronde Denis, capitaine d'une compagnie détachée de la Marine, à qui j'ai remis en main les ordres de la Reine, et confèrera avec vous des raisons pour lesquelles ils sont déteus. J'espère, Monsieur, que vous rendrez toute la justice

année, ayant en prévision amassé des vivres pour deux ans.<sup>1</sup> Vetch savait si bien qu'il n'avait aucun droit sur les Acadiens, et qu'il commettait une criante injustice en les retenant malgré eux, qu'il se hâta d'écrire aux lords du commerce dès le 9 mars de cette année : "Comme la saison avance, à moins que des ordres prompts ne soient expédiés, les habitants vont émigrer avec leurs troupeaux et leurs effets au Cap-Breton, ce qui va dépouiller et ruiner entièrement la Nouvelle-Ecosse et en même temps faire du Cap-Breton une colonie populeuse et bien pourvue, entreprise que plusieurs années et de grandes dépenses n'accompliraient pas, si on la faisait directement de France."<sup>2</sup>

On jugera de l'importance qu'attachait le gouverneur Vetch aux établissements français par le passage suivant d'une lettre qu'il adressait peu de mois auparavant aux mêmes lords du commerce : "Les Français forment une population d'environ deux mille cinq cents âmes... Ils sont, avec les sauvages, les seuls habitants de ce pays ; et, comme ils ont contracté des mariages avec les sauvages, qui sont de même religion, ils ont sur eux une puissante influence. Cent Français, nés dans le pays, parfaitement accoutumés comme ils le sont aux forêts, habiles à marcher en raquettes et à conduire des

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due, et que vous n'aurez d'autre vue que de suivre les volontés de la Reine." — *Archives de la Marine et des Colonies. Lettre de M. L'Hermite à M. Nicholson*. Louisbourg, le 11 juillet 1714.

"Celuy qui commande au Port-Royal a fait défense de sortir du pays avant l'arrivée de M. Nicholson ; de sorte que tous ceux qui sont venus ici s'étoient échappés. Ils m'ont représenté, ainsi que M. Gaulin et les Pères de l'Acadie qui m'ont tous envoyé des express, qu'il étoit nécessaire d'y envoyer un officier pour soutenir leurs droits, les Anglois ayant défendu aux missionnaires de se mêler des affaires de ces habitants." — *Archives de la Marine et des Colonies. Lettre du major L'Hermite au Conseil de Marine*, datée de Louisbourg, 29 août 1714.

"Par sa lettre du 6 novembre 1715, il marque (M. de Costebelle) qu'il a parlé au Sieur Capon, envoyé du gouverneur de Port-Royal, de la manière dure et injuste avec laquelle le général Nicholson avoit traité les habitants françois de l'Acadie, contraire en tout aux ordres qu'il avoit reçus de la feue Reine d'Angleterre, et à la parole qu'il avoit donnée aux Sieurs de la Ronde et Pinsens.

"Cet envoyé a convenu que la conduite de ce général n'avoit été approuvée d'aucun officier de sa nation ; mais que le gouverneur particulier ne pouvoit rien changer sans de nouveaux ordres du roy d'Angleterre ; ainsi tous les autres différents mouvements sont suspendus pour la libre évacuation des habitants jusqu'à une plus ample décision des deux couronnes." — *Conseil de Marine*, 27 mars 1716.

Un récent biographe qualifie Vetch de *premier* gouverneur anglais de la Nouvelle-Ecosse. Les pièces citées dans le présent article démontrent surabondamment le contraire. — *Collections of the Nova Scotia Historical Society*, vol. IV. *Biographical sketch of Hon. Samuel Vetch*, by the Rev. G. Patterson.

<sup>1</sup> M. de Costebelle, par sa lettre du 9 septembre, marque "... qu'on l'a assuré que les habitants françois des Mines n'ont pointensemencé leurs terres en 1715, qu'ils avoient des grains pour vivre deux ans et qu'ils restoient disposés à une entière évacuation lorsqu'ils auroient des bâtiments pour les transporter à l'île Royale avec leurs familles et leurs effets." — *Conseil de Marine*, 28 mars 1716.

"Le P. Dominique à son retour lui a présenté (à M. de Costebelle) un mémoire par lequel il paroît que les peuples de l'Acadie étoient déterminés à tout abandonner pour sortir de la domination des Anglois ; que la plupart même n'avoient pas voulu ensemencer leurs terres dans l'espérance qu'on les retireroit au printemps ; que plusieurs avoient construit des bateaux pour le transport de leurs familles et de leurs effets ; qu'il y en avoit dix prêts à naviguer dès qu'on leur auroit envoyé les agrès..." — *Conseil de Marine*, 28 mars 1716.

M. Begon, par sa lettre du 25 septembre 1715, marque "que le P. Justinien, missionnaire récollet au Port-Royal, lui a marqué que tous les habitants françois de l'Acadie ont pris la résolution d'aller s'établir à l'île Royale à quoi une lettre pastoral de M. l'évêque de Québec a beaucoup contribué."

"... Les Anglois font tout ce qu'ils peuvent pour retenir les Français, non seulement en les ménageant, mais aussi en leur refusant les choses nécessaires pour leur passage, et leur faisant entendre qu'ils ne leur permettront pas de disposer de leurs immeubles ni de leurs bestiaux, qu'on leur donnera seulement quelques vivres." — *Conseil de Marine*, 28 mars 1716.

<sup>2</sup> *Letter from Col. Vetch to the Board of Trade*, March 9<sup>th</sup>, 1714-15. Voir Doc. INEDITS, II. Pièce omise dans le volume d'*Archives de la Nouvelle-Ecosse* publié à Halifax.

canots d'écorce, sont de plus grande valeur et d'un plus grand service que cinq cents hommes nouvellement arrivés d'Europe. Il faut en dire autant de leur habileté à la pêche et à la culture du sol."<sup>1</sup>

On n'avait pas à la cour de France une moindre opinion de ces Français d'outre-mer. Le Conseil de Marine, qui siégeait au Louvre, disait d'eux vers le même temps :

" Ces Français-acadiens sont naturellement industrieux.<sup>2</sup> Ils naissent forgerons, menuisiers, tonneliers, charpentiers, constructeurs ; ils font eux-mêmes les toiles et les étoffes dont ils s'habillent ; c'est pourquoi, outre le défrichement des terres de l'île Royale, ils fourniraient à cette colonie un nombre considérable de bons ouvriers qui contribueraient bien mieux à son établissement que des personnes qu'on y enverrait de France et qui ne seraient faites ni au climat, ni aux usages du pays."<sup>3</sup>

## II

Un des moyens dont les autorités anglaises se servirent, pour tenir les Acadiens et les lier à la Nouvelle-Ecosse, fut le serment d'allégeance qu'elles voulurent dès lors leur imposer.

La mort de la reine Anne et l'accession du roi George premier au trône d'Angleterre, en fournirent l'occasion au gouverneur Caulfield, qui venait de remplacer le colonel Vetch. Il chargea deux de ses officiers, MM. Capoon et Button, de parcourir les centres acadiens depuis Port-Royal jusqu'à Beaubassin et la rivière Saint-Jean, d'y convoquer des assemblées, d'y lire la proclamation officielle envoyée de Londres, et de tâcher d'arracher un serment d'allégeance en faveur du nouveau roi. Le serment du *test* renfermant un acte d'apostasie, il ne put être question de l'imposer. On y substitua la formule suivante :

" ... Je promets sincèrement et jure que je veux être fidèle et tenir une véritable allégeance à Sa Majesté le roi George.

" Ainsi Dieu me soit en aide."

Cette tentative était un piège aussi habile que dangereux ; car si les Acadiens avaient prêté ce serment sans réserve, on n'aurait pas manqué de s'en prévaloir pour leur dire qu'ils s'étaient déclarés et étaient devenus sujets anglais, et que, par conséquent, ils n'avaient plus le droit de quitter le pays.<sup>4</sup>

Les Acadiens se tirèrent de ce mauvais pas avec autant d'habileté que de sagesse. La lettre des habitants des Mines, en particulier, est à citer, car elle est un modèle du genre.

" Pour satisfaire à ce que vous nous avez fait l'honneur de nous publier mercredi dernier... nous avons l'honneur de vous dire que l'on ne peut être plus reconnaissant que nous le sommes des bontés du roi George, lequel nous reconnaissons être légi-

<sup>1</sup> *Archives de la Nouvelle-Ecosse*, p. 6.

<sup>2</sup> " Ces peuples sont naturellement adroits et industrieux au-delà de ce qui se voit en Europe ; ils réussissent en tout ce qu'ils entreprennent ; ils ne doivent qu'à la nature la connaissance qu'ils ont de plusieurs arts. *Archives de la Marine et des Colonies. Mémoire concernant les habitants de l'Acadie*. — 1717.

<sup>3</sup> *Conseil de Marine*, 5 juin 1717.

<sup>4</sup> Je leur ai dit tout ce que j'ai pu pour leur faire comprendre que, s'ils ont une fois prêté serment de fidélité, qu'ils n'auront pas la liberté de sortir un grain de bled de chez eux...



time souverain de la Grande-Bretagne, et sous la domination duquel nous nous ferions une véritable joie de rester, étant aussi bon Prince qu'il l'est, si nous n'avions pris, dès l'été dernier, avant de savoir son exaltation à la couronne, la résolution de retourner sous la domination de notre Prince, le roi de France, ayant même donné tous nos seings à l'envoyé de sa part auquel nous ne pouvons contrevenir jusqu'à ce que leurs deux Majestés de France et d'Angleterre aient disposé de nous autrement ; quoique nous nous obligions avec plaisir et par reconnaissance, pendant que nous resterons ici, à l'Acadie, de ne rien faire ni entreprendre contre Sa Majesté Britannique le roi George."<sup>1</sup>

Les habitants de Port-Royal, placés à portée des canons du fort, et par suite obligés à de plus grands ménagements que les autres, consentirent à prêter une espèce de serment, mais avec des réserves tellement explicites qu'elles ne pouvaient donner prise d'aucun côté. Voici le texte même de ce serment :

"Je promets sincèrement et jure que je veux être fidèle et tenir une véritable allégeance à Sa Majesté le roi George, tant que je serai à l'Acadie et Nouvelle-Ecosse, et qu'il me sera permis de me retirer là où je jugerai à propos, avec tous mes biens meubles et effets, quand je le jugerai à propos, sans que nulle personne puisse m'en empêcher."

"Annapolis Royale, ce 22 janvier 1715."

(Suivent les signatures.)<sup>2</sup>

J'ai insisté à dessein sur cet épisode de l'histoire des Acadiens ; parce que ce fut là le commencement des interminables querelles, au sujet du serment, qui allèrent toujours en s'envenimant, jusqu'à la catastrophe de 1755.<sup>3</sup>

La position de ce peuple resta la même sous le successeur de Caulfield, John Doucet, dont le nom indique évidemment une descendance acadienne devenue protestante. Déjà ce gouverneur commençait à tourner en accusation, contre les Acadiens, la détention forcée que ses prédécesseurs leur avaient fait subir. Il osa même reprocher au gouverneur de Louisbourg l'insuccès de la mission du capitaine de la Ronde, ajoutant que c'était au grand détriment des domaines de Sa Majesté le roi George, parce que, si les habitants qui avaient signé s'étaient retirés, on aurait placé sur les terres des sujets de Sa Majesté.<sup>4</sup>

La réponse de M. de Saint-Ovide de Brouillan ne se fit pas attendre et fut péremptoire :

"A l'égard des plaintes que vous me faites que les habitants de l'Acadie ne s'étant point retirés comme l'on en était convenu, et que ce retardement a causé de la perte à Sa Majesté Britannique, vous avez dû savoir, Monsieur, l'impossibilité dans laquelle Monsieur de Nicholson et autres commandants de l'Acadie les ont mis de pouvoir exécuter les conventions que l'on avait faites ; les uns en ne voulant pas leur laisser emporter leurs biens, et les autres n'ayant voulu permettre qu'il leur fût, par nous, envoyé des appareaux pour gréer leurs petits bâtiments qu'ils avaient construits et dont ils ont été obligés de se défaire

<sup>1</sup> *Public Record Office. Lettre des habitants des Mines au gouverneur Caulfield, 3 janvier 1714-15. — Voir Doc. INEDITS, IV. — Pièce omise dans le volume d'Archives de la Nouvelle-Ecosse publié à Halifax.*

<sup>2</sup> *Public Record Office. — Voir Doc. INEDITS, no I. — Pièce omise dans le volume d'Archives de la Nouvelle-Ecosse publié à Halifax.*

<sup>3</sup> Les habitants de Port-Royal, des Mines et de Beaubassin écrivirent à cette occasion, à M. de Saint-Ovide, gouverneur du Cap-Breton, une lettre à laquelle celui-ci répondit par une espèce de plaidoyer rédigé par demandes et par réponses, pour indiquer aux Acadiens la manière de se défendre. — Voir dans les Doc. INEDITS, XIX-XX, les deux intéressants documents : Lettre des Acadiens en réponse à M. de Saint-Ovide.

<sup>4</sup> *Public Record Office. — Voir Doc. INEDITS, VII. — Pièce omise dans le volume d'Archives de la Nouvelle-Ecosse publié à Halifax.*



presque pour rien aux marchands anglais ; je ne manquerai pas d'informer le roi mon maître de tout ce que vous me marquez sur cela, afin qu'il y donne les ordres qu'il jugera à propos..."<sup>1</sup>

Il serait trop long d'énumérer les vexations auxquelles le gouverneur Doucet soumit les Acadiens dans le but de les amener à prêter le serment d'allégeance ; il suffit de dire qu'il n'y parvint pas, et que ce fut pour cela qu'il fut remplacé, en 1720, par un personnage bien plus important et revêtu de plus amples pouvoirs, le général Richard Philipps, commandant d'un régiment de l'armée anglaise, arrivant avec le titre de capitaine général et gouverneur en chef de Plaisance (île de Terre-Neuve) et de la province de la Nouvelle-Ecosse. Le général Philipps était un soldat éprouvé, mais plein de son propre mérite et se prenant fort au sérieux. C'était, au fond, un homme bon, assez bienveillant, dont le grand défaut était une ladrerie peu ordinaire. Il le prit tout d'abord de fort haut avec les Acadiens. N'étant encore arrivé qu'à Boston, il parlait déjà de les réduire par la force, et écrivait à Londres, aux lords du commerce, pour leur demander l'autorisation de faire venir trois compagnies de soldats stationnés à Plaisance, afin d'augmenter dans ce but la garnison de Port-Royal.<sup>2</sup>

Ainsi le plan de temporisation, inventé par Nicholson en trahison de son devoir et poursuivi par ses successeurs avec la même mauvaise foi, arrivait au résultat qu'ils en avaient espéré. Philipps allait profiter de l'inaction à laquelle les Acadiens avaient été condamnés pour s'arroger sur eux une autorité à laquelle il n'avait pas le moindre droit. En effet, les Acadiens étaient restés absolument et uniquement sujets français, n'ayant cessé de réclamer ce titre et proclamant toujours bien haut qu'ils ne relevaient que de leur légitime souverain, le roi de France. Ils n'avaient d'autre tort que d'avoir été honteusement dupés et d'attendre encore, dans leur ignorance et leur naïveté, une réponse promise qu'on se donnait bien garde de leur apporter.

Philipps terminait sa lettre par une charge à fond de train contre "les prêtres et les jésuites" qui, disait-il, fomentaient tout le trouble en Acadie, et empêchaient qu'on ne vînt à bout de la population. Cette accusation, déjà formulée par ses prédécesseurs, allait se répéter sur tous les tons jusqu'à la fin. Elle était fondée, si c'était un crime d'entretenir des compatriotes dans l'amour du patriotisme et de la religion.

Le premier acte de Philipps, en mettant pied à terre à Port-Royal, fut de faire publier partout qu'il avait pleins pouvoirs de régler toutes choses. C'était, dès le début, une assertion complètement fausse. Il est bien vrai que les lords du commerce avaient envoyé quelqu'un en France pour circonvenir la cour de Versailles ; mais ils n'avaient rien fait changer aux conventions conclues entre les deux couronnes.<sup>3</sup> Le traité d'Utrecht restait intact, et la lettre de la reine Anne subsistait dans toute sa force, comme en 1714. Le roi d'Angleterre lui-même n'avait pas le droit d'y contrevenir, encore moins d'autoriser ses représentants à les violer. Il n'y avait qu'une chose à faire en toute justice. C'était de réparer les dommages causés aux Acadiens par sept ans d'injuste détention et par la perte presque totale des moyens de transport qu'ils avaient été obligés de sacrifier, et de leur accorder au moins un an de répit ; en un mot, de les laisser parfaitement libres, soit de rester, soit de vendre leurs propriétés, et d'emporter avec eux leurs effets, aux termes

<sup>1</sup> Voir Doc. INEDITS, XIII.

<sup>2</sup> *Archives de la Nouvelle-Ecosse*, p. 17.

<sup>3</sup> *Archives de la Nouvelle-Ecosse*, p. 16.

de la lettre de la reine Anne. C'était, au reste, ce qui avait été exécuté, en toute bonne foi, à l'égard des habitants de Plaisance placés dans les mêmes conditions qu'eux et renfermés dans les mêmes clauses du traité. C'était là un exemple frappant que le gouverneur de Louisbourg ne manqua pas de rappeler dans sa correspondance avec Philipps, mais que celui-ci avait trop d'intérêt à cacher pour ne pas feindre de l'ignorer.

Sachant qu'il avait affaire à de simples travailleurs sans instruction, il comprit que, s'il pouvait les tenir isolés de leurs missionnaires et des officiers de Louisbourg, les seuls hommes d'expérience à leur portée, il aurait bien plus de chance de les amener à ses fins. Il réitéra donc les défenses faites par ses prédécesseurs aux missionnaires d'influencer leurs ouailles et même de sortir de la province sans une autorisation de sa part. Il lança ensuite une proclamation (10 avril) où il s'est peint lui-même dans l'exorde flamboyant qu'on va lire et qui lui parut propre à en imposer au peuple.

“ PAR SON EXCELLENCE RICHARD PHILIPPS, Ecuyer, Capitaine Général et Gouverneur en Chef de la Province de Sa Majesté, la Nouvelle-Ecosse ou Acadie, etc...

“ Sa Sacrée Majesté George par la grâce de Dieu roi de la Grande-Bretagne et d'Irlande, etc... Duc de Brunswick et Lunenbourg, Seigneur de Brême, Souverain Prince de Hanovre, Prince Electeur du Saint-Empire, seigneur de plusieurs vastes domaines en Amérique, et en particulier l'incontestable Souverain Seigneur de toute la Nouvelle-Ecosse ou Acadie, aussi bien par traité que par conquête, etc... etc...”<sup>1</sup>

Après cette pompeuse énumération de titres, Philipps proclamait les pleins pouvoirs qu'il prétendait avoir reçus, mais que son roi lui-même, lié par les traités, comme je viens de le dire, n'avait pas le droit de lui accorder; il concluait sa proclamation en intimant aux Acadiens l'ordre de prêter serment au roi d'Angleterre, ou d'évacuer le pays dans l'espace de quatre mois sans emporter leurs effets.

Les Acadiens furent atterrés en lisant cette proclamation, affichée dans tous les principaux endroits. Comme toujours, dans leurs perplexités, ils eurent recours à leurs amis dévoués, les missionnaires, et décidèrent, malgré les défenses de Philipps, le P. Justinien, religieux récollet, curé des Mines, à aller porter leurs plaintes au gouverneur de Louisbourg.

On imagine la belle colère dans laquelle entra le général en apprenant que le P. Justinien s'était échappé furtivement et s'était fait le porteur d'un tel message. Était-ce un grand crime? Quel est l'homme de cœur qui, à sa place, n'aurait pas fait comme lui?

“ Nous prenons la liberté, disaient les Acadiens à M. de Saint-Ovide de Brouillan (16 mai), de vous écrire par le R. P. Justinien pour avoir l'honneur de vous rendre nos humbles respects et véritables soumissions.

“ Nous avons jusqu'à présent conservé les véritables sentiments de sujets fidèles à l'égard de notre invincible monarque. Le temps est arrivé que nous avons besoin de sa protection royale et des secours que vous, Monsieur, pouvez nous donner en cette occasion. Le général anglais qu'on attendait depuis longtemps, est arrivé, muni, comme il l'a signifié, de toute l'autorité de son prince, pour nous obliger à prêter serment de fidélité, ou à nous retirer dans le cours de quatre mois, sans pouvoir rien emporter de toutes nos facultés, excepté deux moutons qu'il nous a accordés par famille, prétendant que le reste

<sup>1</sup> *Public Record Office, Nova Scotia*, vol. 3. — Voir DOC. INEDITS, XIV. — Pièce omise dans le volume d'*Archives de la Nouvelle-Ecosse* publié à Halifax.

tombe sur le domaine du roi son maître. Cependant dans cette conjecture si pressante, nous avons gardé notre fidélité au roi, en signant tout de nouveau que nous voulions persister dans la fidélité à notre prince et à notre religion, car vous le verrez par la copie que nous vous envoyons de la réponse à la proclamation publiée par le dit général. C'est donc à présent, Monsieur, que nous avons recours en premier lieu aux lumières et aux conseils dont votre prudence peut nous assister en des occasions si fâcheuses, et en second lieu aux secours effectifs que vous pouvez nous donner, si nous sommes obligés de quitter nos biens.<sup>1</sup>”

Cette démarche inattendue des Acadiens, leur appel au représentant de la France par une voix aussi autorisée que celle du curé des Mines, déconcertèrent Philipps et lui firent craindre de sérieux embarras. L'agitation était, en effet, extrême parmi les Français, et se propageait rapidement chez leurs voisins, les sauvages ; et le gouverneur n'avait à sa disposition qu'une poignée d'hommes pour maintenir l'ordre. Il est vrai que les Acadiens n'avaient plus de vaisseaux pour se transporter par mer, mais ils menaçaient de se retirer par terre avec leurs effets et leurs troupeaux du côté de Chignectou (Beaubassin) et de la Baie-Verte, où il aurait été difficile de les atteindre, et d'où ils auraient pu, au besoin, passer dans l'île Saint-Jean. Ils s'étaient même mis à l'œuvre et avaient commencé à ouvrir entre Port-Royal et le bassin des Mines un chemin à travers la forêt, que Philipps défendit de continuer.<sup>2</sup>

Ce fut un des grands torts des Acadiens de ne pas avoir persévéré dans cette idée ; ils auraient eu sans doute à souffrir de grandes misères, mais ils auraient évité de bien plus grands malheurs.

Les sauvages de la Nouvelle-Ecosse, de leur côté, voyaient de très mauvais œil les efforts que faisaient les Anglais pour soumettre les Acadiens à leur autorité, car ils refusaient eux-mêmes de la reconnaître, se regardant comme les seuls maîtres du pays, et disant que, s'ils avaient permis aux Français de s'y établir, c'était par pure bonté et parce que les robes noires leur avaient montré la lumière de l'Évangile. Ils menaçaient même les Acadiens de leur inimitié, s'ils consentaient à prêter serment.<sup>3</sup>

La présence du P. Justinien à Louisbourg en de telles circonstances fit craindre à Philipps de nouvelles complications, d'autant plus qu'au moment de son départ ce père lui avait écrit une lettre dans laquelle il lui annonçait qu'il quittait la province pour n'y plus revenir. Il allait donc être libre de ses actions, il irait peut-être même jusqu'en France porter au pied du trône les réclamations des Acadiens. Philipps crut donc prudent de dissimuler sa colère, et se hâta d'écrire au P. Justinien une lettre fort obligeante,

<sup>1</sup> *Archives de la Marine et des Colonies, Acadie.*

<sup>2</sup> *Archives de la Nouvelle-Ecosse*, p. 26.

<sup>3</sup> M. de Costebelle marque, que “quelques démarches que les Anglais aient pu faire pour se concilier ces nations (les sauvages) ils n'ont pu en venir à bout. Le sieur Capon a même avoué qu'ayant été député vers elles pour leur insinuer de reconnaître le roi d'Angleterre et souffrir qu'il fût proclamé parmi eux dans une assemblée publique, ils n'avoient jamais voulu (*le*) souffrir, et lui avoient répondu qu'il n'y avoit point d'autre roi qu'eux sur leurs terres, et que s'ils souffroient les François, ce n'étoit qu'en considération de ce que le roi étoit leur père, les ayant mis dans la véritable voie du salut et de l'Évangile.

“Qu'ils continuent à ne vouloir souffrir aucuns nouveaux établissements anglois sur la côte de l'Acadie, et aucun de leurs bâtimens n'ose plus mouiller dans les ports ni rades foraines fréquentés par les sauvages... Tous ces sauvages reconnoissent le sieur Gaulin pour leur missionnaire.

“NOTA. — Il est canadien et du séminaire des Missions étrangères établi en Canada ; il est brave et a fait la guerre avec ces sauvages contre les Anglois.” — *Conseil de Marine*, 28 mars 1716.

dans laquelle il tâchait de l'adoucir et l'invitait à venir reprendre son poste. Quand on a sous les yeux les invectives que le même Philipps écrivait, en ce moment-là même, à Londres, contre les missionnaires, il est plaisant de voir avec quelle déférence, quelle obséquiosité il traite le P. Justinien, dont il se souscrit le *sincère ami*.<sup>1</sup>

Philipps, qui tenait à ne pas se brouiller avec Saint-Ovide de Brouillan en un moment où la France et l'Angleterre étaient dans les meilleurs termes, et qui redoutait en même temps son intervention en faveur des Acadiens, lui écrivit, vers le même temps, pour lui expliquer sa conduite. Il lui représentait les ordres qu'il avait reçus de la cour, et le pria d'engager les Acadiens à la soumission, ajoutant que, s'il survenait des troubles, il les attribuerait à ses conseils, et que la responsabilité en retomberait sur lui.<sup>2</sup> Saint-Ovide de Brouillan lui répondit avec autant de fermeté que de raison :

“ L'inaction, dit-il, dans laquelle ces peuples sont restés jusqu'à présent, ne peut ni ne doit leur être imputée à crime tant par rapport au défaut des secours essentiels à leur transmigration que par les obstacles que les gouverneurs généraux et particuliers qui vous ont précédé y ont mis.

“ Je ne puis pas non plus me dispenser, Monsieur, de vous exposer que les deux clauses de votre proclamation qui concernent le terme et les circonstances de leur évacuation me paraissent peu conformes aux assurances de bienveillance qu'ils avaient de la part de la cour d'Angleterre, surtout après un traité et une convention de bonne foi entre la feue reine Anne et le roi Louis quatorze de glorieuse mémoire, traité qui a été exécuté en entier de la part de la France et en partie de la part de l'Angleterre.

“ Vous n'ignorez pas, Monsieur, que par cette convention le sort des habitants de l'Acadie était et devait être le même que celui des habitants de Plaisance; on ne peut rien ajouter à la gracieuseté et à la bonne foi avec lesquelles s'est traitée cette évacuation, et j'aurai l'honneur de vous représenter que rien ne pourrait être plus dur que l'extrémité ou pour mieux dire l'impossibilité à laquelle se trouveraient réduits ces pauvres peuples, si vous ne vouliez vous relâcher en rien du temps que vous leur accordez et de la manière dont vous exigez leur sortie.

“ En vérité, Monsieur, ce serait leur faire sentir bien faiblement les effets de la bienveillance royale du roi votre maître, que vous leur faites valoir avec tant et de si justes titres dans votre proclamation, et dont ils avaient de si heureux préjugés par le traité et la convention dont vous ne pouvez ignorer ni les clauses ni le poids.

“ Je suis persuadé, Monsieur, qu'en considération de cette sincère, indissoluble et inviolable union qui se trouve entre les roys nos maîtres et leurs états, vous ne refuserez pas l'attention convenable à la représentation que j'ai l'honneur de vous faire, et que trouvant à l'avènement à votre gouvernement l'heureuse occasion de faire valoir la forte inclination que vous me protestez avoir de vous y conformer en tout ce qui pourra dépendre de vous, vous me donnerez les occasions d'y répondre en faisant valoir au roi mon maître l'humanité avec laquelle vous aurez traité ses sujets en cette importante occasion.”<sup>3</sup>

<sup>1</sup> *Archives de la Nouvelle-Ecosse*, p. 24.

<sup>2</sup> *Archives de la Nouvelle-Ecosse*, p. 28.

<sup>3</sup> *Public Record Office, Nova Scotia*, vol. III. Lettre de Saint-Ovide de Brouillan au général Philipps. Cette pièce d'une importance capitale a été omise dans le volume d'*Archives de la Nouvelle-Ecosse* publié à Halifax. Voir *DOC. INEDITS*, XVIII.

La lettre de M. de Brouillan est confirmée par l'extrait suivant des délibérations du Conseil de Marine :

“ L'Acadie n'a été cédée par le traité de paix d'Utrecht qu'à des conventions qui n'ont point été remplies par les Anglois.

Cependant l'agitation allait toujours croissant parmi les Acadiens, qui se croyaient forts de la justice de leur cause. Allaient-ils en venir jusqu'à une révolte? Le gouverneur Philipps, qui d'ailleurs n'était pas un homme intraitable, en eut d'assez fortes appréhensions pour comprendre qu'il ne devait pas les exaspérer davantage. Le terme de quatre mois était à la veille d'expirer, et il n'avait encore rien obtenu. Il voulut se donner le mérite des concessions en ayant l'air d'accorder par faveur ce qu'il ne pouvait refuser par force, et il annonça qu'il prolongeait le temps fixé pour l'évacuation du pays, en se taisant toutefois sur le reste. Ses officiers les plus expérimentés lui faisaient remarquer que, dans le cas d'une insurrection, la seule paroisse de Port-Royal était en état d'assembler et d'armer quatre cents hommes en vingt-quatre heures. Dès lors, la garnison, enfermée dans le fort, ne pouvait les empêcher de tout détruire derrière eux, de rompre les digues, brûler les maisons, granges, moulins, provisions, etc., en un mot, tout ce qui restait, tandis que leurs familles, aidées des autres habitants, se fraieraient un chemin, avec leurs troupeaux et leurs effets, jusqu'au bassin des Mines. Là, ils rencontreraient le gros de la population, et rien n'était plus facile que de continuer l'œuvre de destruction et de se retirer tous ensemble aux confins de leurs établissements, à Beau-Bassin et à la Baie-Verte, en face de l'île Saint-Jean, où les Français venaient, cette année-là même, de bâtir un fort et de transporter deux cents familles,<sup>1</sup> avec toutes les provisions et le matériel nécessaire à une colonie. Que deviendrait dans ce cas la petite garnison de Port-Royal privée de subsistance et harcelée par les sauvages, que les Français ne manqueraient pas de soulever avec eux?

Philipps ne se rendait que trop bien compte de cette éventualité, lorsqu'il envoyait à Londres le rapport de l'ingénieur Mascarène, qui l'indiquait en toutes lettres.<sup>2</sup> Aussi, ajoutait-il avec amertume... : "Nous n'avons ici qu'une ombre de gouvernement; son autorité ne s'étend pas au-delà de la portée des canons du fort."<sup>3</sup>

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"Par une convention mutuelle entre les deux couronnes le sort des habitants de Plaisance et de l'Acadie étoit égal, avec la permission de se retirer, ils devoient avoir la liberté d'emporter leurs biens meubles et de vendre les immeubles.

"Le seing de la reine Anne pour lors régnante en étoit le garant et l'évacuation de Plaisance en 1715, où toutes les clauses furent exécutées, en est une preuve incontestable...

"Le refus absolu qu'ont toujours fait les gouverneurs anglois de souffrir que les vaisseaux même du roi vinssent à l'Acadie pour transporter ceux qui étoient de bonne volonté, ou à prêter des agrès pour les bâtiments qu'ils avoient construits et qu'ils ont été obligés de vendre aux anglois, la défense qui leur a été faite depuis de transporter avec eux aucuns bestiaux ni provisions de grains, la douleur d'abandonner leurs biens, héritages de leurs pères, leur travail et celui de leurs enfants, sans aucun remboursement ni dédomagement. Toutes ces infractions sont les motifs principaux de l'inaction dans laquelle ils sont demeurés, ce qui fait aujourd'hui leur seul crime. Ce fut dans ce sentiment qu'ils firent au mois de mai de l'année dernière une députation à MM. de Saint-Ovide et Soubras pour leur communiquer la réponse qu'ils avoient faite au gouverneur anglois sur les instances réitérées avec menaces de prêter serment de fidélité au roi d'Angleterre ou de sortir incessamment du pays, cette réponse fut qu'ils étoient hors d'état de prêter ce serment parce qu'ils étoient liés à leur légitime souverain par un double lien qu'ils ne pouvoient trahir sans par là même devenir suspect au roi d'Angleterre. Qu'à l'égard de leur sortie, ils étoient prêts d'évacuer et abandonner leur pays puisqu'il avoit plû au roi de le céder, mais que ce ne seroit que lorsqu'on les mettroit en état de le faire sur le même pied et aux mêmes conditions des habitants de Plaisance dont ils avoient pour gage sacré le sceau et la signature de la reine Anne." — *Conseil de Marine, année 1719. vol. IV, fol. 96.*

<sup>1</sup> C'est le chiffre donné par Mascarène; (*Archives de la Nouvelle-Ecosse*, p. 48.) mais il paraît de beaucoup exagéré.

<sup>2</sup> *Archives de la Nouvelle-Ecosse. Rapport de Mascarène*, pp. 39 et suivantes.

<sup>3</sup> *Archives de la Nouvelle-Ecosse*, p. 51.

Dans une telle situation, il faut bien avouer que le gouvernement de Port-Royal fut fort heureux d'avoir eu à agir avec une population aussi raisonnable et aussi pacifique que les Acadiens. Et qui les avaient formés ainsi, qui les conseillaient, qui les empêchaient de se révolter ? C'étaient les missionnaires, ces mêmes missionnaires qu'on accusait d'être les auteurs de tout le mal. Ceux-ci, on le sait, n'auraient eu qu'un mot à dire pour faire lever en masse tous les Acadiens, qui d'ailleurs en avaient plein droit. Ce mot, les missionnaires ne le prononcèrent point. S'il y a un reproche à leur faire, c'est plutôt d'avoir trop prêché la soumission et d'avoir peut-être préparé ainsi les calamités à venir.

La lettre du P. Justinien, au moment de son départ des Mines, est l'expression de la pensée et de la conduite de ses confrères :

“Je vous prie de me permettre de me retirer à l'île Royale, afin que l'on ne m'impute pas les troubles qui pourraient arriver. Je suis et je serai tout à fait éloigné de fomenter le trouble, que je sois loin ou proche ; ce n'est pas que j'aie la pensée que nos Français aient envie de remuer. Je leur rendrai toujours cette justice qu'ils aiment la paix. Mais dans un pays comme celui-ci, ouvert à tous ceux qui voudraient piller et mal faire, le plus court est d'en sortir promptement quand on n'y prétend plus rien.”<sup>1</sup>

Après deux ans de séjour en Acadie, Philipps, qui, avant d'y arriver, se targuait de tout faire courber sous lui, s'en retourna en Angleterre, découragé, dégoûté de l'apathie de la métropole restée sourde à toutes ses représentations, et honteux de n'avoir rien accompli.

### III

Nous allons voir revenir, sous le régime de son successeur, le colonel Armstrong, cette éternelle question du serment, qui se renouvellera périodiquement jusqu'à ce qu'elle ait amené la destruction finale. Par la faute de ses premiers représentants en Acadie, l'Angleterre avait placé le peuple acadien, et s'était placée elle-même, dans une fausse position, d'où ni l'un ni l'autre ne savaient plus comment sortir. Dès 1720, les officiers de la couronne étaient déjà fatigués de cette question, et se demandaient s'il ne valait pas mieux en finir par une expulsion totale des Acadiens ; mais, en communiquant cette idée au gouvernement de la Nouvelle-Ecosse, ils ajoutaient ceci, qu'il est essentiel de bien retenir :

“Vous ne devez pas entreprendre de les expulser sans un ordre positif de Sa Majesté.” (*Your are not to attempt their removal without His Majesty's positive order.*)<sup>2</sup> On sait quel cas le gouverneur Lawrence fit de cette ordre si formel.

Armstrong était un esprit inquiet, mal équilibré, d'un caractère fantasque, tour à tour bienveillant et tyran. Il finit par perdre la tête, et se suicida dans un accès de frénésie. Réussir là où ses prédécesseurs avaient échoué, c'était son idée fixe, son ambition ; il y mettait de la vanité. Il prit à tâche de faire prêter, coûte que coûte, le serment d'allégeance aux Acadiens, et se mit à les tourmenter de nouveau à ce sujet. Tous les moyens

<sup>1</sup> *Public Record Office, Nova Scotia*, vol. III. *Lettre du P. Justinien Durand au gouverneur Philipps*, 26 mai 1720. — Voir Doc. INÉDITS, XV. Pièce omise dans le volume d'*Archives de la Nouvelle-Ecosse*.

Le P. Justinien Durand mourut à Québec, victime de son zèle, en administrant les sacrements à des équipages atteints de fièvres contagieuses (1747).

<sup>2</sup> *Archives de la Nouvelle-Ecosse*, p. 58.

furent mis en œuvre pour y parvenir : cajoleries, menaces, pénalités, promesses, et jusqu'à de l'argent.

Enfin, le dimanche, 25 septembre 1726, son rêve commença à se réaliser. Il se frottait les mains de joie en se rendant, dans l'après-midi de ce jour-là, à la séance du Conseil. Le drapeau britannique flottait au-dessus du bastion où se tenaient les assemblées du Conseil. La séance s'ouvrit sous sa présidence, en présence des députés acadiens et d'un grand nombre d'habitants.

Ce fut alors une scène vraiment machiavélique, et qui serait d'un haut comique, si elle n'était odieuse. Elle est trop caractéristique pour n'être pas rapportée en détail. On va voir avec quel art perfide Armstrong attira peu à peu les Acadiens dans son piège et les y fit tomber.

“Je suis heureux, leur dit-il, de vous voir réunis ici, et j'espère que vous comprenez les avantages dont vous allez jouir et que vous transmettez à vos enfants. J'ai confiance que vous êtes venus avec une parfaite résolution de prêter serment de fidélité comme de bons sujets, et que vous êtes animés de sentiments de soumission et de loyauté à la fois honnêtes et sincères envers un roi aussi bon et aussi gracieux que le nôtre, et qui vous a promis, si vous prêtez ce serment et si vous l'observez avec fidélité, qu'il vous accordera non seulement le libre exercice de votre religion, mais même la jouissance de vos propriétés et les droits et immunités de ses propres sujets nés dans la Grande-Bretagne. Quant à moi, tant que j'aurai l'honneur de commander ici, je ferai tous mes efforts pour maintenir tout ce que Sa Majesté a si gracieusement promis de vous accorder.”<sup>1</sup>

À la suite de ce discours, quelques-uns des habitants demandèrent qu'on leur fît la lecture de la traduction française du serment. Après l'avoir entendue, ils demandèrent qu'on insérât une clause par laquelle ils ne seraient pas obligés de prendre les armes.

Le gouverneur s'empressa de leur dire qu'ils n'avaient aucune raison de craindre une pareille éventualité, puisqu'il était contraire aux lois de la Grande-Bretagne qu'un catholique romain servît dans l'armée anglaise. Sa Majesté, dit-il, avait tant de fidèles sujets protestants à pourvoir de cet honneur, que tout ce qu'elle exigeait des Acadiens, c'était qu'ils fussent de fidèles sujets et qu'ils ne se joignissent à aucun de ses ennemis ; que, s'ils se comportaient ainsi, ils n'auraient qu'à jouir en paix de leurs biens et à les améliorer en toute sécurité.

Malgré ces protestations du gouverneur, tous refusèrent de prêter serment, et insistèrent pour que la clause fut insérée.

Alors le gouverneur, avec l'approbation du Conseil, permit qu'elle fût écrite en marge de la traduction française, afin, dit-il dans son rapport, de les gagner graduellement (*in order to get them over by degrees*).

Là-dessus, ils prêtèrent serment et apposèrent leurs signatures sur la double copie française et anglaise. Il n'est pas besoin de dire ce que devint la traduction française avec sa note marginale compromettante. Armstrong avait en mains dans le texte anglais l'instrument qu'il convoitait depuis si longtemps, et qu'il allait avoir tant d'orgueil à expédier à Londres, en se vantant d'avoir accompli ce que personne n'avait pu faire auparavant.

Le gouverneur termina cette détestable comédie par une nouvelle exhortation à la

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<sup>1</sup> *Archives de la Nouvelle-Ecosse*, pp. 66, 67.



soumission et à la fidélité au roi. Enfin, après avoir bu à la santé de Sa Majesté, de la famille royale, et après avoir porté plusieurs autres santés, le gouverneur les congédia en leur souhaitant une bonne nuit.

On juge de la satisfaction avec laquelle Armstrong dut écrire peu de temps après à Londres : "Je trouve véritablement que tout le monde est très-satisfait ici, Français et sauvages, de la paix qui règne et du serment de fidélité juré au roi George, résultat qui m'a coûté et qui me coûtera encore beaucoup d'argent et bien des peines et du travail."<sup>1</sup>

Ce résultat n'était cependant pas aussi considérable qu'Armstrong le faisait entendre ; car, dans l'assemblée du 25 septembre, le serment n'avait été prêté en définitive que par les habitants de Port-Royal. Partout ailleurs, malgré des tentatives réitérées, il n'avait rencontré que des refus. Mais son premier succès l'avait grisé et lui faisait espérer de tout régler à la prochaine occasion. Cette occasion ne se fit pas attendre ; elle se présenta d'elle-même par la mort du roi George I et l'avènement au trône de son fils George II, en faveur duquel il fallut prêter serment d'allégeance.

Le gouverneur se flattait qu'il ne rencontrerait que peu de difficultés à Port-Royal, où il ne s'agissait, pensait-il, que de réitérer le serment déjà prêté ; mais il n'en était pas de même dans les autres établissements, où il venait d'échouer, où sa faible autorité se faisait à peine sentir, où il fallait des ménagements infinis, où enfin il ne pouvait espérer réussir qu'à force de stratagèmes. La clause contenant l'exemption de prendre les armes, que ceux de Port-Royal avaient exigée par écrit, et sans laquelle ils n'auraient pas consenti à prêter serment, allait y être exigée avec bien plus de rigueur. Il n'y avait pas moyen de l'éviter, il fallait y consentir. On y consentirait donc ; c'était entendu à mots couverts, quitte à trouver ensuite un prétexte pour l'éluder. Ce serait une autre note marginale à insérer dans une copie française quelconque, qu'il n'y aurait plus qu'à faire disparaître comme la première. Cela n'avait pas de conséquence parce que le texte anglais était le seul qui fit foi, le seul dont on eût besoin : *the English being what I had to govern myself by*.<sup>2</sup> C'est ce que dit en toutes lettres dans son rapport l'enseigne Robert Wroth, l'officier envoyé par Armstrong dans les établissements éloignés pour proclamer le nouveau roi et réclamer le serment d'allégeance.

Wroth, au moment de son départ de Port-Royal, avait reçu des instructions écrites, dont la teneur indique l'ardeur extrême que le gouverneur mettait au succès de sa mission. Elles portaient qu'il devait les suivre d'une manière générale et ne devait s'en écarter *que si les circonstances et les lieux l'exigeaient*. (*Instructions from which you are not to depart unless where circumstances and place may so require*).<sup>3</sup> C'était lui donner en quelque sorte carte blanche, et l'exposer, si c'était un homme faible, à tout céder aux Acadiens.

Ceux-ci, prévenus à temps, s'étaient concertés et avaient résolu de faire un dernier effort pour obtenir la justice qu'on leur avait toujours déniée, c'est-à-dire l'exécution du traité d'Utrecht et des ordres de la reine Anne. A Beau-Bassin comme à Cobequid, à Pigiquit comme à la Grand'Prée, Wroth rencontra la même fermeté. On le reçut avec

<sup>1</sup> *Archives de la Nouvelle-Ecosse*, p. 70.

<sup>2</sup> *Public Record Office, America and West Indies*, vol. XXIX. — *Ensign Wroth's Proceedings up the Bay*, 12 nov. 1727. Pièce omise dans le volume d'*Archives de la Nouvelle-Ecosse* publié à Halifax.

<sup>3</sup> *Public Record Office, Am. & W. Indies*, vol. XXIX. — *Armstrong's Instructions to Ensign Wroth*, 28 sept. 1727. — Pièce omise dans le volume d'*Archives de la Nouvelle-Ecosse* publié à Halifax.



beaucoup d'égards, on fêta par des salves de mousqueterie l'avènement du roi ; mais avant de prêter serment, on lui fit signer les articles suivants :

“ Je, Robert Wroth, Enseigne et Adjudant des Troupes de Sa Majesté le roi George le Second, promets et accorde, au nom du roi mon maître, et de l'Honorable Lawrence Armstrong, Ecuier, son Lieutenant-Gouverneur, etc., Commandant en chef de cette Province, aux habitants des Mines, de Pisiquid et dépendances, qui auront fait et signé le serment de fidélité au roi George le Second, les articles ci-dessous qu'ils m'ont demandés (savoir) :

“ 1o — Qu'ils auront le libre exercice de leur religion et pourront avoir des missionnaires, dans les lieux nécessaires, pour les instruire, catholiques, apostoliques et romains.

“ 2o — Qu'ils ne seront nullement obligés à prendre les armes contre qui que ce soit, et de nulle obligation de ce qui regarde la guerre.

“ 3o — Qu'ils demeureront en une véritable possession de leurs biens qui leur seront accordés à eux et leurs hoirs dans la même étendue qu'ils en ont joui ci-devant et en payant les mêmes droits accoutumés du pays.

“ 4o — Qu'ils seront libres de se retirer quand il leur semblera, et de pouvoir vendre leurs biens et de transporter le provenu avec eux sans aucun trouble, moyennant toutefois que la vente sera faite à des sujets naturels de la Grande-Bretagne, et lorsqu'ils seront hors du terrain de Sa Majesté ils seront déchargés entièrement de leur signature de serment.”

“ ROBERT WROTH.”<sup>1</sup>

Une fois maîtres de cette pièce, qui rétablissait leurs droits incontestables, les Acadiens n'hésitèrent plus à prêter serment selon la formule suivante :

“ Je promets et jure de bonne foi que je serai sincère et fidèle à Sa Majesté le roi George le second.”

De leur côté, les habitants de Port-Royal avaient exigé les mêmes conditions du gouverneur lui-même, mais avec un résultat bien différent. Armstrong ne s'était plus possédé de colère en recevant la requête qui lui avait été présentée et qu'il avait qualifiée d'insolente rébellion contre Sa Majesté et son gouvernement. Il avait fait jeter en prison et mettre dans les fers les trois députés, Charles Landry, Guillaume Bourgeois et François Richard, qui avaient osé lui remettre cette requête.<sup>2</sup>

C'est dans cette disposition d'esprit qu'Armstrong reçut l'enseigne Wroth à son retour à Port-Royal. On s'imagine le désappointement et l'indignation avec lesquels il accueillit son rapport. Il le fit comparaître devant le Conseil, qui censura avec lui sa conduite et désavoua les articles en déclarant toutefois, par une étrange contradiction, les Acadiens liés par le serment qu'ils avaient prêté.<sup>3</sup> C'était une indignité de plus à ajouter à tant d'autres ; et ce ne devait pas être la dernière.

Armstrong enleva en même temps aux prétendus rebelles le droit de commercer avec les trafiquants anglais et de pêcher sur les côtes, privilèges réservés, disait-il, aux seuls sujets de Sa Majesté. C'était le dernier moyen qui lui restait pour se venger d'avoir vu toutes ses espérances s'envoler en fumée.<sup>4</sup>

<sup>1</sup> *Public Record Office, Am. & W. Indies*, vol. XXIX. *Original des Articles cy dessous que j'ay accordé aux habitants des Mines, Pigiquit, et dépendances.* Pièce omise dans le volume d'*Archives de la Nouvelle-Ecosse* publié à Halifax.

<sup>2</sup> *Archives de la Nouvelle-Ecosse*, p. 78.

<sup>3</sup> *Idem*, p. 79.

<sup>4</sup> *Archives de la Nouvelle-Ecosse*, pp. 74. 77.

La nouvelle de cette déconvenue, parvenue à Londres, fit décider le renvoi du gouverneur en chef, le général Philipps, dont Armstrong n'était que le suppléant avec le titre de lieutenant-gouverneur.

L'expérience acquise par Philipps durant sa première administration faisait espérer qu'il parviendrait à mettre un terme à la situation anormale de la Nouvelle-Ecosse. Il réussit en effet à faire prêter serment aux Acadiens (1730), en leur accordant une des concessions qui leur tenaient le plus au cœur, celle de ne point porter les armes contre leurs compatriotes les Français, ni contre les sauvages leurs alliés. De là le nom de Neutres (*French Neutrals*) qui leur fut donné depuis.

O'était une révolution dans leur existence : de sujets français ils devenaient sujets anglais. Dix-sept ans de résistance prouvent jusqu'à quel point c'était malgré eux.

Chacun des gouverneurs, l'un après l'autre, les avait retenus captifs dans leur propre pays, et avait refusé d'exécuter le traité et les ordres de la reine Anne. Par suite les Acadiens n'avaient pu profiter des avantages que la France leur avait offerts, au lendemain de la paix, pour s'établir à l'île Royale. Dans l'intervalle, la France s'était de plus en plus désintéressée d'eux, et eux, de leur côté, s'étaient vus rivés de plus en plus à l'Acadie par l'augmentation rapide de leurs familles et par la valeur toujours croissante de leurs propriétés. Enfin ils avaient été vaincus par la lassitude d'une lutte sans issue, et cela sans aucune faute de leur part.

Malheureusement, en prêtant serment avec la condition de rester neutres, les Acadiens ne paraissent pas avoir obtenu que cette clause fût mise par écrit et jointe à la formule du serment, comme ils l'avaient exigé de l'enseigne Wroth. Ce fut là une grande faute de leur part, et qu'ils expièrent cruellement plus tard.<sup>1</sup>

Il était facile de prévoir qu'un pareil régime ne pouvait aboutir qu'à des résultats funestes pour le petit peuple naissant, qui se trouvait ainsi placé entre deux puissances rivales, toujours prêtes à en venir aux mains, et qui ne manqueraient pas de se disputer sa neutralité. Il était fatalement destiné à être victime ; mais son infortune a dépassé toute prévision.

En 1732, Philipps s'en retourna en Angleterre pour jouir du succès de sa mission, et abandonna de nouveau à Armstrong l'administration de la province.

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<sup>1</sup> Les Acadiens ne furent pas sans inquiétude sur ce sujet, car ils firent dresser et signer un acte authentique de cette promesse par les hommes les plus autorisés qu'ils eussent parmi eux. Voici le certificat des missionnaires :

“ Nous, Charles de la Gaudalis, Prêtre, Curé Missionnaire de la Paroisse des Mines, et Noël Alexandre Noiville, Prêtre, bachelier de la Sacrée Faculté de Théologie de Sorbonne, Missionnaire Apostolique et curé de l'Assomption et de la Sainte-Famille de Piguit, certifions à qui il appartiendra, que Son Excellence le Seigneur Richard Philipps, écuyer, capitaine en chef et Gouverneur-Général de la Province de Sa Majesté la Nouvelle-Ecosse ou l'Acadie, a promis aux habitants des Mines et autres rivières qui en dépendent qu'il les exempte du fait des armes et de la guerre contre les François et les Sauvages, et que lesdits habitants se sont engagés uniquement et ont promis de jamais prendre les armes dans le fait de la guerre contre le Royaume d'Angleterre et Son Gouvernement. Le présent certificat fait et donné et signé par Nous cy-nommés, le 25 Avril 1730, pour être mis entre les mains des habitants et leur valoir et servir partout où besoin sera ou que de raison en est.”

(Signé)

Debourg,  
Bellehumeur,

Collationné le 25 avril.

*Archives des Affaires étrangères, Paris.*

De La Gaudalis, Curé.  
Noël Noiville,  
Prêtre et Missionnaire.

## IV

On a vu qu'une des clauses du traité d'Utrecht garantissait aux colons le libre exercice de la religion catholique ; on a vu aussi les promesses faites par les autorités anglaises de respecter cette garantie. Si l'on s'en tenait seulement aux affirmations des gouverneurs, on serait porté à croire qu'il n'y eut jamais de justes plaintes à porter contre eux touchant l'exécution de cette clause. Cela est cependant difficile à concilier avec le fanatisme intense qui régnait à cette époque, et avec les cris de haine qui retentissent d'un bout à l'autre de leurs rapports. Mais on a, pour s'éclairer et se former un jugement impartial, les témoignages des parties adverses, je veux dire des Acadiens et des missionnaires. Ces témoignages donnent une tout autre idée du régime qu'ils subissaient. Il faut que les Acadiens aient eu à souffrir de bien criantes injustices pour avoir été obligés, à plusieurs reprises, d'aller porter leurs plaintes et implorer protection jusqu'au pied du trône de France. Une de ces requêtes, couverte des signatures des habitants de Port-Royal, représente au roi Louis XV qu'ils sont en proie à une véritable persécution religieuse de la part du gouverneur Armstrong.

“ Nous supplions, disent-ils, très-humblement Votre Grande Majesté de nous permettre de représenter la triste situation où nous sommes réduits, déclarant véritablement que dans la paroisse de Saint-Jean-Baptiste d'Annapolis-Royale, en la Nouvelle-Ecosse ou Acadie : Que le 29 mai (nouveau style) de l'année 1736, contrairement aux articles du traité de paix fait à Utrecht, et contrairement à toutes les promesses à nous faites, quand nous avons prêté le serment de fidélité à Sa Majesté Britannique le roi George II, le gouverneur Laurent Armstrong a fait défense à MM. de Saint-Poncy et Chauvieux, nos deux prêtres missionnaires aussi dignes que nous en ayons jamais eus, a fait défense disons-nous, de dire la sainte messe, entrer dans l'église, entendre nos confessions, nous administrer les autres sacrements et faire aucune de leurs fonctions ecclésiastiques. Mis aux arrêts et obligés de partir, les dits missionnaires, sans que le gouverneur, ni autres personnes qu'il a pu faire tomber dans son avis, aient pu nous faire connaître, ni qu'ils puissent prouver que nos susdits et dignes missionnaires aient d'autres fautes que celles dont ils prétendent les trouver coupables, pour n'avoir pas voulu aller loin de notre paroisse relever un brigantin, ce qui ne regarde en rien nos dignes missionnaires ni leurs fonctions. Le dimanche suivant le dit gouverneur fit assembler les députés et leur fit défense de faire ni dire aucune prière dans la chapelle du haut de la rivière... Ce sont ces tristes et déplorables conjonctures où nous sommes *chaque jour* exposés au sujet de notre religion, article qui nous touche de plus près, qui nous oblige d'implorer, avec la dernière soumission, Sa Majesté chrétienne le Roi de France Louis XV pour qu'elle daigne... faire déterminer et arrêter, d'une manière stable, les conditions auxquelles nos missionnaires pourront se tenir dans la suite, afin que nous ne soyons pas privés de secours spirituels *au moindre caprice* de ceux qui commandent.”<sup>1</sup>

Les paisibles Acadiens n'en étaient pas venus à ces énergiques protestations sans avoir été provoqués pendant longtemps, et sans avoir longtemps patienté. Un de leurs prêtres, entre autres, l'abbé Gaulin, vieillard vénérable, blanchi dans les missions sauvages, où il n'avait eu souvent, écrivait-il lui-même, pour toute nourriture, que les coquil-

<sup>1</sup> Archives de la Marine et des Colonies. Amérique du Nord. Acadie.

lages de la mer, <sup>1</sup> l'abbé Gaulin n'avait été arraché de prison, où le tenait Armstrong, et restitué à ses paroissiens les habitants des Mines, que parce que ce gouverneur espérait calmer par là l'irritation de ces habitants, et les amener à prêter serment. <sup>2</sup>

Mais cela n'était rien comparé aux avanies et aux persécutions qu'eut à endurer l'abbé de Breslay, prêtre de Saint-Sulpice, l'un des curés de Port-Royal. Armstrong l'insulta jusque dans l'église, pendant qu'il y remplissait les fonctions sacrées, et fit fouetter des habitants pour les forcer à déposer contre lui. Il fit piller sa maison, briser ses portes, vendre ses bestiaux, dont il garda le profit pour lui-même. Plusieurs fois il attenta à sa vie. Enfin il l'obligea, par ses violences et ses poursuites, à aller se cacher au fond des bois durant plus de quatorze mois.

L'abbé de Breslay ne vit d'autre moyen de se protéger que de porter ses plaintes en Angleterre, où le gouverneur dut aller en personne se défendre.

L'accusation la plus grave portée contre l'abbé de Breslay était de s'être mêlé des affaires du gouvernement. Mais il y répondit de la manière la plus triomphante en produisant des certificats du général Philipps lui-même et de M. Cosby, président du Conseil de la Nouvelle-Ecosse, attestant que de leur pleine connaissance et de celle des habitants, tant anglais que français, l'abbé de Breslay s'était bien comporté en toute occasion. <sup>3</sup>

Certains gouverneurs avant Armstrong avaient voulu forcer les Acadiens à rejeter l'autorité de l'évêque de Québec, de qui ils relevaient, et à violer par là les règles les plus élémentaires de la hiérarchie catholique. <sup>4</sup>

J'ai déjà dit ailleurs que quelques-uns de ces gouverneurs avaient même voulu imposer des lois aux missionnaires jusque dans l'administration des sacrements de l'Eglise. Ainsi, par exemple, le gouverneur Mascarène écrivit des lettres de menaces à l'abbé Desenclaves, parce qu'il avait retenu l'absolution à des individus qui refusaient de faire les restitutions auxquelles ils étaient obligés.

Cet abus d'autorité n'est pas le seul qu'on puisse reprocher à Mascarène; il suffit toutefois pour démontrer que, si ce gouverneur ne se laissa pas entraîner aux excès dont s'était rendu coupable l'énergumène qui l'avait précédé, son administration ne fut cependant pas exempte de graves infractions à la liberté religieuse.

Mais ce qui était plus alarmant que tout le reste, et ce qui faisait croire aux Acadiens aussi bien qu'à leurs prêtres que leur foi était en danger, c'étaient les tentatives de perversion faites parmi eux, dans la persuasion où étaient les gouvernants que c'était le seul moyen d'en faire de *bons sujets* (*sic*).

"Les Anglais, dit le mémoire déjà cité, ont une application particulière pour les séduire par leurs discours et leurs conversations, par des écrits imprimés ou manuscrits qu'ils répandent parmi eux ou qu'ils leur prêtent à lire, par des objections continuelles qu'ils leur font sur la religion. Les missionnaires eux-mêmes sont quelquefois attaqués par les ministres, soit en disputes verbales ou par des écrits.

"Ce n'est pas tout, ils emploient même contre eux en haine de la religion les vexations et les persécutions." <sup>5</sup>

<sup>1</sup> *Archives du séminaire de Québec.*

<sup>2</sup> Comme trait caractéristique, voici une des aménités d'Armstrong à l'adresse de l'abbé Gaulin : *that old mischievous incendiary Gaulin! Ce vieux malfaisant incendiaire Gaulin.* — *Archives de la Nouvelle-Ecosse*, p. 69.

<sup>3</sup> *Archives de la Marine et des Colonies. Etat présent des missions de l'Acadie.*

<sup>4</sup> *Archives de l'archevêché de Québec.*

<sup>5</sup> *Archives de la Marine et des Colonies. Etat présent des missions de l'Acadie.*

Je ne veux pas répéter ici les autres faits du même genre que j'ai rapportés dans *Un Pèlerinage au pays d'Evan-*

Telle était la situation des Acadiens au point de vue religieux. Et pourtant le libre exercice du culte catholique leur avait été garanti par les traités ; pourtant les gouverneurs avaient engagé leur parole, à maintes reprises, qu'ils respecteraient cette garantie.

Jetons maintenant un coup d'œil en arrière, et voyons ce qui ressort des faits que nous venons de raconter.

Il est établi et prouvé, par des témoignages aussi nombreux qu'irrécusables, que le traité d'Utrecht a été ouvertement violé, et que la lettre de la reine Anne n'a jamais été exécutée, et cela uniquement par la faute et la mauvaise volonté bien arrêtée des gouverneurs de la Nouvelle-Ecosse.

Il est clairement prouvé que le général Nicholson a empêché, par tous les moyens possibles, les Acadiens d'évacuer la province, malgré leur volonté bien formelle et leurs protestations écrites et signées par tous les chefs de famille, en présence des représentants de la France ; que le même général Nicholson, dans le but de retenir les Acadiens, les a empêchés de vendre leurs terres et d'emporter leurs effets ; qu'il a fait saisir les embarcations qu'ils avaient construites ; qu'il a interdit l'entrée des ports aux navires français destinés à apporter les agrès demandés par les Acadiens ; que même ce gouverneur a été jusqu'à défendre à ceux-ci d'en faire venir de Boston.

Il est prouvé non moins clairement que les successeurs de Nicholson, Vetch, Caulfield, Doucet, Philipps durant sa première administration, Armstrong, et Philipps durant sa seconde administration, ont également empêché, obstinément et sans interruption, les Acadiens de quitter la Nouvelle-Ecosse, en leur défendant de vendre leurs terres et d'emporter leurs effets.

Il est également prouvé, par les promesses écrites du gouverneur Armstrong, approuvées par son conseil, promesses réitérées par le général Philipps, que les Acadiens n'ont prêté serment de fidélité au roi d'Angleterre qu'à la condition de ne point prendre les armes en cas de guerre.

Enfin, il est encore prouvé par des témoignages aussi nombreux qu'irrécusables, que les gouverneurs de la Nouvelle-Ecosse ont attenté à la liberté religieuse promise aux Acadiens, et cela par des violations et des outrages capables d'exciter à la révolte les populations les plus douces et les plus paisibles.

Et, en retour de ces outrages et de ces violations, qu'ont fait les Acadiens ? Quelle a été leur conduite après trente ans de ce régime ? Quand la guerre entre la France et l'Angleterre leur fournit une belle occasion de se venger de leurs perfides maîtres (1744-48), n'auraient-ils pas eu le droit de se révolter contre eux et de secouer leur joug ? N'auraient-ils pas dû leur dire : "Depuis que vous avez mis le pied dans notre pays vous nous avez toujours trompés ; vous nous tromperez encore. C'est vous-mêmes qui, par vos continuels manques de parole, nous avez déliés de la nôtre ?"

Est-ce là ce que firent les Acadiens ? Je laisse répondre pour eux leur propre gouverneur : "C'est au refus des habitants français de prendre les armes contre nous, écrivait Mascarène, que nous devons la conservation de la Nouvelle-Ecosse."<sup>1</sup>

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*geline.* Je rappellerai seulement le système inventé par Shirley, gouverneur du Massachusetts, pour pervertir les Acadiens au moyen d'écoles anglaises, ou de primes en argent ou autres, accordés pour chaque apostasie.

<sup>1</sup> "To.... the French inhabitants refusing to take up arms against us, we owe our safety." — *Archives de la Nouvelle-Ecosse. Lettre de Mascarène, déc. 1744, pp. 147, 148.*

## V

Il resterait maintenant à montrer comment les Acadiens en furent récompensés. Mais cela m'entraînerait au-delà des limites d'une conférence. Je me contenterai de révéler deux actes de tromperie, dignes pendants de ceux que je viens de raconter, qui eurent lieu peu de temps avant la déportation des Acadiens, et qui en furent les préparatifs. Je m'abstiendrai de qualifier ces actes, qu'on est parvenu à cacher sous le voile de l'oubli. Je les laisserai stigmatiser par un écrivain anglais et protestant, le docteur Andrew Brown, qui a vécu dans la Nouvelle-Ecosse à la fin du siècle dernier, où il a été en relations directes avec plusieurs des auteurs et des victimes de la déportation, qu'il a interrogés spécialement pour écrire son *Histoire de la Nouvelle-Ecosse*, restée manuscrite.

Le premier de ces actes fut un guet-apens tendu aux Acadiens pour leur arracher toutes leurs armes et leurs munitions. Cet attentat eut lieu au mois de juin 1755, c'est-à-dire sept ans seulement après la guerre durant laquelle les Acadiens s'étaient montrés si loyaux, et avaient empêché par leur neutralité, les Français de reconquérir la Nouvelle-Ecosse. Dans l'intervalle la physionomie de cette province avait changé. Les griffes du lion britannique s'étaient singulièrement allongées. Le temps était passé où les petits gouverneurs de Port-Royal, avec une poignée de soldats, se lamentaient derrière ses murs éboulés, de ne pouvoir réduire les Acadiens. La ville d'Halifax avait été fondée et fortifiée ; des forts avaient été élevés en différents endroits de la péninsule, principalement le fort Lawrence sur l'isthme, en face de Beauséjour, et le fort Edouard à Pigiquit. Toutes ces nouvelles places étaient bien munies de soldats.

Dès ce moment, les Acadiens avaient senti leurs chaînes se resserrer et s'appesantir. Malgré les promesses solennelles d'Armstrong et de Philipps, le gouverneur Cornwallis avait voulu exiger des habitants français un serment *sans réserve*, c'est-à-dire qui les obligeait à prendre les armes contre leurs propres compatriotes. Qu'on se rappelle les paroles d'Armstrong : " Mes amis, vous n'avez aucune raison de craindre qu'on vous force à prendre les armes ; car les lois de la Grande-Bretagne interdisent à tous catholiques romains de servir dans les armées anglaises. D'ailleurs, le roi d'Angleterre a tant de sujets protestants à pourvoir de cet honneur, que tout ce qu'il demande de vous, c'est que vous soyez de fidèles sujets."

La volte-face ne pouvait être plus évidente ; mais qu'importaient les contradictions ? On se sentait assez fort pour changer de discours.

Bien que la guerre ne fût pas encore déclarée entre la France et l'Angleterre, le fort français de Beauséjour était assiégé par Monckton. Un bon nombre d'Acadiens avaient commis le grand crime de fuir devant l'orage qui allait fondre sur leur tête ; ce fut dans ces circonstances que le second successeur de Cornwallis, Charles Lawrence, de triste mémoire, inventa la ténébreuse combinaison qu'on va voir, dans le but d'enlever toute espèce d'armes et de munitions aux Acadiens restés sous sa main.

La première précaution prise fut de feindre une grande partie de plaisir, une excursion de pêche (*a fishing frolic*), afin de ne pas éveiller les soupçons des habitants. Un détachement d'une cinquantaine d'hommes envoyés d'Halifax était venu prêter main-forte à la garnison du fort Edouard. Au jour fixé, des piquets de soldats furent postés à la tête des chemins par où les Acadiens auraient pu s'échapper. Les troupes furent divisées par escouades et mises en marche vers chaque village, de manière à n'y arriver qu'à la chute

du jour. Au lieu de faire camper les soldats dans les granges, comme cela se faisait ordinairement, les officiers avaient ordre de les distribuer deux par deux dans les maisons. De même qu'à la fameuse tragédie de Glencoe, les soldats, mis dans les secrets de la conspiration, devaient s'amuser, boire et manger en amis avec la famille durant la soirée, et se coucher ensuite tranquillement. Mais au coup de minuit (*at the hour of twelve in the dead of night*), ils devaient se lever soudainement et s'emparer de toutes les armes et munitions qu'ils pourraient saisir.

Le coup réussit à merveille, comme on devait s'y attendre avec un monde aussi honnête et aussi peu défiant qu'étaient les Acadiens. Deux jours après, quatre cents fusils, une grande quantité de cornes à poudre et de munitions, étaient réunis et entassés dans une goélette ancrée à ce dessin dans la rivière Pigiquit, et remontés de là au fort Edouard où ils furent mis en sûreté.

Il ne manquait à cet exploit qu'un dernier outrage (*a new outrage*), dit le docteur Brown. Lawrence ne faillit point à la tâche.<sup>1</sup> Il lança une proclamation ordonnant à tous ceux qui possédaient encore des armes de venir les apporter sans délai au fort Edouard, sous peine d'être traités comme félons et rebelles, s'ils étaient découverts.

Les Acadiens n'auraient-ils pas été des lâches, indignes de sympathie et de commisération s'ils n'avaient pas ressenti de tels affronts ? Ils en furent révoltés, et protestèrent en hommes de cœur, forts de leur innocence et de leurs droits. Croira-t-on qu'à Halifax on trouva le moyen de tourner en accusation contre eux l'expression de leur noble et juste indignation ? Cela devait être, au reste ; ceux qui avait conçu et exécuté le coup étaient incapables de sentiments élevés. Je laisse parler un des auteurs de ce honteux méfait, qui s'en est fait l'apologiste.

" Les Français neutres, se croyant fort lésés, écrivirent une très impudente lettre au gouverneur et au Conseil, prétendant que, puisque le gouvernement continuait à leur accorder les privilèges de sujets anglais, personne n'avait le droit ni le pouvoir de les en priver ; qu'ils se comporteraient comme de fidèles sujets neutres de Sa Majesté. Cette lettre était signée par tous les députés de cette partie de la province et par la plupart des habitants, en particulier par tous les principaux chefs, et l'on vit paraître, dans la contenance de chacun des Français neutres, un air de ressentiment accompagné de menaces qui indiquaient leur esprit de rébellion." <sup>2</sup>

Le second acte qui me reste à raconter est encore plus ignoble que le premier. La pièce importante qui le révèle a été trouvée par le docteur Brown lui-même dans les papiers

<sup>1</sup> C'est sur Lawrence, avant tout autre, que pèse la responsabilité de la déportation des Acadiens. On a un portrait de son caractère, fait de première main par ses propres compatriotes, les colons d'Halifax. C'est une de ces pièces qu'on ne s'est pas empressé de livrer au grand jour. Elle va nous apprendre comment cet individu de bas étage, d'abord simple apprenti peintre en bâtiment, était parvenu jusqu'au grade de gouverneur de la Nouvelle-Ecosse ; comment, dans ce haut poste, il avait gardé son caractère de parvenu ; quelle espèce de tyrannie il faisait peser sur ses concitoyens ; à quel genre de corruption il se livrait ; par quelles fraudes il avait accaparé à son propre profit, et au profit de ses favoris, les dépouilles des malheureux Acadiens, entre autres plus de quatre mille six cents têtes de bétail, dans la seule paroisse de Pigiquit. Ce fait n'a rien de surprenant pour ceux qui savent que le jour même où ce gouverneur faisait annoncer aux Acadiens que leurs biens étaient confisqués par la couronne, il faisait saisir et emmener à Halifax leurs plus beaux chevaux pour servir à son propre usage.

Voir *Laurence's character* : Doc. INEDITS, XXIII.

<sup>2</sup> *Mus. Brit. Dr. A. Brown's MSS. Papers relating to Nova-Scotia, 1749-1790. Add. MSS. No. 19073, fol. 121.* Cette pièce est reproduite dans les DOCUMENTS INEDITS, XXII.



du conseil d'Halifax. Ce dernier fait nous met en présence du dilemme suivant : Ou bien cette pièce a été enlevée de ces archives, ou elle y est encore. Si elle a disparu, Haliburton a raison. Si, au contraire, elle s'y trouve, elle a été bien cachée, et la honte a dû y être pour quelque chose, car le contenu de cette pièce dépasse les limites de l'odieux, et indique, dans la société où elle a été conçue, une absence de sens moral qui renverse l'imagination. On y apprend, dans les plus minutieux détails, toutes les secrètes machinations, tous les plans divers, ourdis par les plus hauts personnages d'Halifax, dans le but d'arriver à tromper et à surprendre les Acadiens en masse, de leur mettre la main dessus, afin de les déporter, comme en définitive on n'y a que trop bien réussi. Que la responsabilité de tout cela retombe sur les membres du Conseil, à la tête duquel était le gouverneur ; le fait que cette pièce a eu sa place dans leurs archives en est la preuve. Et n'allons pas croire que la méditation et l'élucubration de cette salle besogne aient été livrées à quelque individu taré ; non, elle a été confiée par le Conseil même à un juge, au juge Morris d'Halifax, lequel, par parenthèse, était natif de la Nouvelle-Angleterre. Ce malheureux était loin de soupçonner, quand il se livrait à cette tâche dans le secret de son cabinet, qu'il se clouait lui-même, avec ses complices, au pilori de l'histoire. Il y est aujourd'hui et il y restera. L'histoire a de ces tardives vengeance.

Du moment que la prise du fort de Beauséjour, seul point d'appui des Français, sur cette frontière, eut rendu possible l'expulsion des Acadiens, et que leur désarmement en eut enlevé un des plus grands obstacles, le gouvernement de la Nouvelle-Ecosse s'occupa activement de mettre ce projet à exécution. Le juge Morris étant considéré comme une des personnes les plus au fait du pays acadien et de ses habitants, ce fut sur lui que le Conseil jeta les yeux pour en obtenir d'exactes informations et l'exposé des divers plans à suivre. Celui-ci s'acquitta de sa tâche avec une ponctualité et une précision dignes d'une meilleure cause.

Il faut lire attentivement tout son rapport pour avoir une juste idée de l'œuvre et de l'homme, pour être en mesure de les apprécier, je veux dire de les mépriser l'un et l'autre autant qu'ils le méritent.

Morris commença son travail par une étude géographique des plus minutieuses.<sup>1</sup> Il décrit chaque paroisse, et, dans chaque paroisse, chaque village et même chaque petit groupe de maisons, qu'il compte une à une. Il marque leurs positions, soit au bord de la mer, soit près des rivières, ou dans l'intérieur des terres. Il signale toutes les voies de communication, tant par eau que par terre, que peuvent suivre les Acadiens pour s'évader, et les moyens de les arrêter. Il n'omet ni une patrouille pour garder une route, ni un vaisseau pour fermer une passe. Tout cela avec une sagacité féline qui rappelle absolument le chat guettant la souris. Mais où le bon juge se surpasse lui-même, c'est dans la variété des pièges et des mensonges qu'il invente pour surprendre et saisir les pauvres Acadiens. Il faudrait, par exemple, tâcher de répandre d'avance parmi eux le bruit qu'on veut les transporter, non pas en exil, mais au Canada. Une fois sous cette fausse impression, ils se rendront plus volontiers. Si on pouvait les persuader de se livrer d'eux-mêmes,

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<sup>1</sup> Cette description a été publiée dans un des rapports de la Société Historique de la Nouvelle-Ecosse, d'après les manuscrits du docteur Brown, (*Collections of Nova Scotia Historical Society*, vol. II, p. 158) ; mais cette Société a agi, relativement à cette pièce, absolument comme le compilateur des *Archives de la Nouvelle-Ecosse*, c'est-à-dire qu'elle l'a tronquée, et qu'elle a laissé dans l'ombre tout ce qui s'y trouve de compromettant. On la trouvera reproduite en entier dans les DOCUMENTS INEDITS qui suivent cette conférence, no XXI.



mais cela n'est guère praticable. Il y a bien les dimanches durant lesquels ils se réunissent tous à l'église, où l'on pourrait peut-être les cerner et les arrêter. Il y a aussi la nuit qui a si bien servi pour les désarmer : si on les surprenait dans leurs lits ; mais ils sont tellement éparpillés qu'on y réussirait difficilement. Enfin le juge a touché du doigt le vrai moyen, celui qui a été adopté en dernier ressort : c'est d'envoyer aux Mines un fort détachement qui les fasse prisonniers après les avoir convoqués en assemblée.

On connaît le Bostonnais qui commanda ce détachement ; ce fut Winslow, lequel continua à son tour à mentir, mais cette fois ouvertement. <sup>1</sup> Dès son arrivée, il commença à répandre le faux bruit qu'il venait simplement passer l'hiver à la Grand'-Prée. C'est aussi à lui qu'est due la fameuse proclamation aux Acadiens, qu'il osa attribuer fausement, comme toujours, au roi d'Angleterre, infligeant ainsi à ce monarque la responsabilité d'un crime auquel, grâce à Dieu, il n'avait pas songé. <sup>2</sup>

Il est à noter qu'au milieu de toutes les infernales combinaisons du juge Morris, il n'est pas fait la moindre allusion au serment sans réserve dont on faisait tant de bruit en ce moment-là même. Peu importait évidemment que les Acadiens prêtassent oui ou non ce serment : ils étaient voués quand même à la déportation. *They are at all adventures to be rooted out.* Ce sont les propres paroles du juge Morris.

Le serment n'était qu'une raison apparente destinée à servir de prétexte pour colorer la condamnation qu'on était décidé à prononcer.

<sup>1</sup> On voit que l'invention et l'exécution du plan destiné à tromper et à saisir les Acadiens pour les déporter, sont dues particulièrement à deux Anglo-Américains, Morris et Winslow. Ce fut leur concours efficace et celui des soldats de la Nouvelle-Angleterre qui permirent au gouvernement d'Halifax de satisfaire la convoitise de leurs compatriotes à l'égard des terres des Acadiens. Cette convoitise datait d'un demi-siècle ; elle avait été l'un des motifs qui avaient engagé, en 1710, les provinciaux de la Nouvelle-Angleterre à s'enrôler dans l'expédition de Nicholson. *Collections of Nova Scotia Historical Society*, vol. IV, p. 22.

On a voulu nier cette convoitise ; mais en voici des preuves qu'on aura peine à révoquer en doute. Elles sont officielles, et émanent du gouverneur Lawrence lui-même. Dans une proclamation datée du 11 janvier 1759, il dit :

"Whereas since ye issuing of ye proclamtn dated ye 12th of Otr 1758, relative to the settlemt of ye vacated lands in this prove. I have been informed by Thos Hancock, Esqr, Agent for ye affairs of Nova Scotia at Boston, that *sundry applicatns* have been made to him in conseqc therof, by persons desirous of settling on ye sd lands..." — *British Museum. — Papers of Dr. Andrew Brown designed for a History of Nova Scotia. Add. MSS.* 19,075 fol. 287.

Dans un autre acte officiel, le même Lawrence ajoute : "...Whereas, since the removal of the said French inhabitants, His Excellency the governor, in order to make an effectual settlement in the province, and to strengthen the same, has been pleased to make grants of townships to many substantial and industrious farmers, Protestants, His Majesty's subjects of the neighbouring colonies... *daily* applying for grants of Townships..." — *British Museum. Add. MSS.*, 19,073, fol. 64, v.

La compagnie Hancock, de Boston, avait été celle qui, à la demande de Lawrence, avait fourni les navires sur lesquels avaient été déportés les exilés acadiens. C'était cette même compagnie à laquelle les *New Englanders* faisaient des demandes fréquentes (*sundry applications*), afin d'obtenir d'être mis en possession par le gouverneur Lawrence des terres laissées vacantes par les Acadiens. D'autres *neighbouring colonists* faisaient directement, dans le même but, des demandes quotidiennes (*daily*) à Lawrence lui-même. Que veut-on de plus ?

Et de qui descendent ceux qui possèdent aujourd'hui les anciennes paroisses acadiennes ? A peine quelques mois s'étaient-ils écoulés depuis la prise de Québec, qu'une flotte composée de vingt-deux navires chargés de *New Englanders*, convoyée par un *Sloop* armé de seize canons, aborda aux rivages acadiens, et vint en prendre possession.

<sup>2</sup> Ce fait ressort clairement de la dépêche du secrétaire d'Etat, sir Thomas Robinson, au gouverneur Lawrence en date du 13 août 1755. Loin de consentir à la déportation des Acadiens, que lui insinuait vaguement Lawrence, sir Thomas lui ordonna absolument le contraire. Aussi, après avoir transcrit cette dépêche, le docteur Brown ajoute-t-il : — *This important : Government at least innocent.*

Et un peu plus loin :

"The Board of Trade extremely guarded — no blame imputable to them on the subject.

"The Board of Trade and Plantations in their dispatch, in answer to governor Lawrence, take no notice of his

Je laisse maintenant le docteur Brown flétrir lui-même la hideuse pièce que je viens d'analyser, et juger le juge Morris :

“ Il a écrit, dit-il, ce rapport, en conséquence, paraît-il, de la demande du Conseil. Il est peu honorable à son cœur, car il est rempli de stratagèmes injustifiables, de cruels avis et de conseils barbares.” (*He wrote this report... little honourable to his heart, as it is replete with unjustifiable stratagem, cruel advice, and barbarous counsel.*)<sup>1</sup>

J'aime à croire que les historiens qui ont cherché à justifier la déportation des Acadiens n'avaient pas en mains toutes les pièces du procès que nous possédons aujourd'hui ; mais je dois dire, à mon grand regret, que celui qui en a fait le récit le plus retentissant, en avait sous les yeux la copie complète, pendant qu'il écrivait.<sup>2</sup> Comment en douter, puisque lui-même l'a avoué ? Il n'y a qu'une triste réflexion à faire : c'est que des livres composés dans un pareil esprit sont fatalement condamnés à disparaître avec les préjugés qui les ont inspirés.

L'historien américain a voulu laver à tout prix ses compatriotes de la tache que l'Histoire leur avait infligée ; mais il n'a réussi qu'à l'agrandir. Il n'est pas de pire faute que celle de vouloir excuser ce qui n'est pas excusable.

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proposal of removing the French inhabitants. They industriously avoid it. — *British Museum.* — *Brown's MSS. Add.* 19,073, fol. 42 et 43.

Voir la dépêche de sir Thomas Robinson, citée et commentée au long dans *Un Pèlerinage au pays d'Évangéline*, p. 92 et suivantes.

Pourquoi le docteur Brown attachait-il tant d'importance à disculper le gouvernement anglais de toute participation à l'exil des Acadiens ? C'est qu'il connaissait toute l'étendue de ce crime et les circonstances odieuses qui l'avaient accompagné.

“ I can take upon me, dit-il, from a painful examination of the whole matter, to assert that Raynal neither knew nor suspected the tenth part of the distress of the Acadiens — and that, excepting the massacre of St. Bartholomew, I know of no act equally reprehensible as the Acadian removal that can be laid to the charge of the French nation. In their Colonies nothing was ever done, that at all approaches to it in cruelty and atrociousness.

“ Saturday, Aug. 13<sup>th</sup>, 1791.”

<sup>1</sup> *Dr. Brown's MSS. Add. MSS.*, 19,072, fol. 30. — Voir *DOC. INEDITS*, p. 137. Note 5.

<sup>2</sup> Parkman, *Montcalm and Wolfe*. Avec la masse de preuves, de pièces authentiques que l'on connaît, comment M. Parkman a-t-il pu se fermer les yeux au point d'écrire ceci, par exemple :

“ *Very few (of the Acadians) availed themselves of this right (of removing with their effects.) Un très petit nombre d'Acadiens se prévalurent du droit d'émigrer avec leurs effets.* Comme si Nicholson, Vetch, Caulfield, Doucet, Philipps, Armstrong, avaient laissé un seul jour ces malheureux libres de se prévaloir de leur droit !

## APPENDICE

## DOCUMENTS INÉDITS SUR L'ACADIE.

## I

EXTRACT OF A LETTER FROM MR. ADAMS TO CAPT. STEELE,<sup>1</sup> JAN. 24, 1714-15.Annapolis Royal, Jan<sup>ry</sup> 24th, 1714-15.

SIR,

I lost the opportunity of writing to you by Alden and Leavis, being then at Mines, we were in hopes here upon the General's arrival, he would pay off the garrison and settle the place on a good footing, but on the contrary, put us in the greatest confusion, pull'd down the fforts, Drove away the french, and carry'd away all the English he cou'd that the place is now almost desolate: In Short if his commission had been to destroy the country, he could not have discharg'd his trust to better purpose than he did, he employ'd all his time here in pursuing his implacable malice against Gov<sup>r</sup> Vetch, when in truth he did the English interest in this country more damage in the two months he was here, than Governor Vetch cou'd have done in all his life, if he had been as bad as he wou'd fain make the world beleive he was. He has stopt all I owe Governor Vetch in his own hands in Wheat & Peas, I deliver'd for the use of the Garrison, a copy of which have sent to madam Vetch, as he us'd to curse & Damm Governor Vetch & all his friends, he is now serv'd himself in the same manner, but with this difference, that it was only he and two or three others who thought to get into his favour thereby, that revill'd Gov<sup>r</sup> Vetch, but there is not one soul in the place french or English (save 2) but hate and abhor his name.

*Endorsed:* Extract of a letter from M. Adams to Capt. Steele, at Boston dated at Annapolis Royal, January the 24th, 1714-15, relating to Col. Nicholson's misbehaviour there.

Rec<sup>d</sup> } May 20th, 1715.  
Read }

## II

LETTER FROM COL. VETCH TO THE BOARD OF TRADE.<sup>1</sup>

March 9, 1714-15.

MY LORDS,

I could not but judge it my duty out of a trew concour for the publick good: to put your Lordships in mind of the circumstances of the country of Nova Scotia, the french inhabitants being in a manner obliged to Leave the country by the treatment they received from Mr. Nicolson while Gov<sup>r</sup> there; as well be made appear to your Lordships by the affidavits of some persons lately come from thence: to which I humbly pray your Lordships to be referred: what I am now to Intimate to your Lordships is, that as the season of the year now advances, unless some speedy orders are sent to prevent the Inhabitants removal with their catle and effects to Cape Brittoun as it will wholly strip and Ruine Nova Scotia so it will att once make Cape Brittoun a populous and well stocked colony, which many years and great expense could not have done directly from France, as I already

<sup>1</sup> Public Record Office. — Col. Records — Nova Scotia. vol. 1.

<sup>1</sup> Public Record Office — Col. Records — Nova Scotia. vol. 1.

observed to your Lordships in a former paper more att large in answer to some queries made by your Lordships to me.

I hope your Lordships will pardon the trouble of this which nothing but my zeal for the service of his Majesty and Colonys could have prevailed with me to have given your Lordships, who am with most profound respect

My Lords  
Your Lordships most Devoted  
humble servt.

SAM VETCH.

March 1. 1714-15.

#### MEMORANDUM.

Mr. Shirif the deponent about Annapolis affairs, is in toun was Clerk to Lt. Gov<sup>r</sup> Cawfeild who will Inform the board how the gates of the fort are ordered to be kept shutt to debarr correspondence with the Inhabitants to oblige them to go to Cape Brittoun many more souldiers are in toun who cann give the board some acc<sup>t</sup> of affairs there tho not so well as Sherif, Mr. Ferquison is gone to sea.

### III

#### OATH TAKEN BY THE FRENCH INHABITANTS ANNAPOLIS ROYAL,<sup>1</sup> 22<sup>d</sup> JAN<sup>y</sup> 1715.

Moy je promes sincerement Et jure que je veut Estre fidelle Et tenir vne veritable alegence a sa majeste Le roy George tan que je sere a Lacadie et nouuel Escosse Et qu'il me sera permy de me retiré La ou je jugeré a propos avec tous mais Bien meuble Et Effet quant je le jugeré a propos san que nulle persone puisse man Enpesché. Annapolis royal ce 22e januier 1715.

J. Bourgeois  
Charle Belliueaux  
marque x de Cleaude Landri  
rocq doucet  
marque x de Claude Landri fils  
marque x de michelle Richarne  
marque x de jean belliueaux  
marque x de jean babineaux  
marque x de Cleaude mellansont  
marque x de pierre mellansont  
marque x nicolas babineaux  
marque x de Charles doucet  
marque o de antoine belliueaux  
marque x de Francois Robicheaux  
marque x de abreant bourque  
marque x de jean Landri  
marque x de Cleaude Grandgé  
marque x de andré Sauari  
marque x de peaux tié  
marque x de pierre pougette

Prudent Robichaux  
Charles Boudrot  
Charlle Guillebeau  
Alexandre raubichau  
Michel richard  
Deni St Jean  
Charle Mellenson  
St Jeain  
Fougerre  
Morice  
Lauerdeur  
pierre Lanouë  
marque p de pierre Leblant  
marque x de pierre broussarre  
pierre Bourg  
marque x de bernare bourg

<sup>1</sup> P. R. O. — Colonial Records. — Board of Trade. — Nova Scotia. Vol. 1.

## IV

ANSWER OF THE INHABITANTS OF MINES.<sup>1</sup>

Moy A. B. Je promes sincerement Et jure que je veu Estre fidelle et tenir une Veritable alegence a Sa majesté le Roy George.

Insy aide moy Dieu.

## MESSIEURS

Pour satisfaire a ce que Vous nous avez fait L'honneur de nous publier mercredis dernier; Et pour La Reponce du quelle nous Vous auons prier de nous donner jusque a dimanche dernier, dans Lequel Temps nous nauons peut Exécuter; Ce a quoi nous nous estions Engagé, Veu que plusieurs ne Voient Rien par Escrit et seulement de vive Voix Et ne sachant pas mesme positivement De quoy Il s'agissoit; Se... sont Retourné chez eux sans faire aucune Reponse; nous auons L'honneur de Vous dire que L'on ne peut Estre plus reconnoissans que nous Le sommes des Bontés que Le Roy George, que nous reconnoissons Estre Légitime Souuerain de la Grande Bretagne veut bien auoir pour nous; Et sous la domination duquel nous nous ferions Vne Veritable jois de Rester, Estant aussy Bon Prince Comme Il Est, Sy nous n'auons pri... dés l'Eté dernier, auparavant qu... Savoir Son Exaltation à la Couronne,... De Retourner sous la domination de... Prince Le Roy De france aiant mesme... Donne tous nos Seings à l'officier enuoier de sa part auquel nous ne pouuons Contrevenir Jusque à ce que leurs Deux Majestés de france Et d'Angleterre aient disposés de nous autrement, quoy que nous nous obligions avec plaisir Et par Reconnoissance pendant que nous resterons ici à la Cadit, de ne Rien faire ny entreprendre Contre Sa Majesté Britannique Le Roy George De La proclamation à la Couronne duquel nous Sommes Témoins qui a été faite par Vous autres Messieurs mercredi dernier En présence des habitants des dits Lieux aux Mines Ce 12e mars 1715 nous soussignés faisant Et Estant autorisés par tous les habitans par la procuration qu'ils nous ont donnez

marque x de Jacques Leblanc  
marque x de Antoine leblanc  
charle babin  
marque x Jassemain  
marque x de jacque grandgé  
Philippe melanson

Claude Landry  
pierre Terriot  
René le blanc  
Jacques le Blanc  
marque x de pierre Richar  
marque x de francois Rainbau  
Jermain Terriot  
marque x de Jean Leblanc  
martin aucoin  
maton (?)

*Endorsed* : Answer of the Inhabitants of Mines relating to the proclaiming of K. George &c.  
rece'd w<sup>th</sup> maj<sup>r</sup> Caulfield's L<sup>r</sup> of 3<sup>d</sup> Jan<sup>y</sup> 1714-15.

## V

RÉPONSE DES HABITANTS DE BEAUBASSIN<sup>2</sup> 28 MARS 1715.

Nous soussignez arbitres de La Communauté De Beaubassin Dans Lacadie faisans pour tous les habitants, Declarons que nous ne pouvons aucunement Donner aucune décision sur ce que monsieur Button officier De Sa Majesté Britannique, et monsieur Capon commissaire De Sa Ditte Majesté, nous

<sup>1</sup> P. R. O. — Col. Records — Nova Scotia. Vol. 1.

<sup>2</sup> R. P. O. — Col. Records — Nova Scotia. Vol. 1.

ont Decclarey enuoyer De La part De monsieur Caulfield gouuerneur Du port Royal, et cela jusqu'a Sa majesté très chrestienne, et Sa majesté Brittanique soient convenües ensemble sur les articles quon Leurs a Deub proposer par des personnes qui ont estez Députées pour ce faire Dont nous attendons tous les jours Reponse, et cela touchant le serment de fidelité que Lon Demande de nous. A Lesgard De La proclamation De Sa majesté Le Roy George a Laccenement<sup>1</sup> De La couronne De La Grande Bretagne, nous certiffions quelle nous a esté faiste par mes Dits Sieurs Button et Capon, et cela avec les cérémonies ordinnaires.

A Lesgard Du Bœuf et Du Lard tous les habitans Decclarent ne pouvoir en donner par Rapport à La saison, mais si nous pouuons Lorsque La Saison le permettra, nous Le ferons de tout nôtre cœur. fait a Beaubassin ce vingt huitieme mars De la présente année mil sept cent quinze

marque de x michel  
Poirier arbittre  
marque O de Martin  
Richard arbittre  
marque x de michel  
Bourq arbittre  
Charles bourgeois  
marque x de françois  
Doucet arbittre  
Jean Sire arbittre  
Alexis Cormier

*Endorsed:* Nova Scotia — The answer of the inhabitants of Checanectou relating to the Oath of Fidelity required of them.

rece'd w<sup>th</sup> majo<sup>r</sup> Caulfield's L<sup>r</sup> of 3r<sup>d</sup> Jan<sup>y</sup> 1714-15.

## VI

### LETTER FROM MAJ<sup>r</sup> CAULDFIELD TO COL. VETCH.<sup>2</sup>

Annapolis Royall Nov<sup>r</sup> the 2, 1715.

S<sup>r</sup>,

The arrival of the transport laden with provisions brought me the pleasure of yours; I am but too senceable of Co<sup>l</sup> Nickolsons unpresedented malice, and had his designes taken their desired effect I am perswaded there had not been att this time an inhabitant of any kind in the country n<sup>or</sup> indeed a garrison: when I recollect his declaration to the inhabitants and after-words to the soldiers wherein he told the latter that the french were all rebells and would certainly cut their throats if they went into their houses telling of us that we must have no manner of correspondence with them, and ordered the gates of the garrison to be shut tho att the same time he was senceible that we could not subsist the ensuing winter but by their mains there being no other prospect left us; for by his stoping our pay att home and ruining our credit att Boston we were brought to the last extremity; itt would be endless to enter into particulars of a description of his management here, but cannot forbare to relate you, that as he was in his house he observed one of the soldiers comeing into the Garrison with a rotton pallasado one of those you formerly displaced and renewed, upon which he called for all the officers of the garrison and in a very unbecoming manner told us we should loose the Garrison if

<sup>1</sup> Sic.

<sup>2</sup> P. R. O. — Col. Records — Nova Scotia, vol. II.

there was not better care taken and ordered the fellow to prison, and in two days afterwards he did not have one pallasado standing about the fort, which remains so to this day: if the whole seine of his administration here was plainly laid downe, it would be very difficult to find out one instance of all his proceedings whereby the Garrison or collony could receive the least benefit: Will: Winnett writes you about your horses therefore at present I shall trouble you no further any more than to assure you that I am with all respect.

Y<sup>r</sup> most obedient humble Ser<sup>vt</sup>

THO: CAULFIELD

*Endorsed*: Nova Scotia.

Letter from Major Caulfield Lt Gov<sup>r</sup> of Annapolis Royal to Col. Vetch dated 2<sup>d</sup> of Novem<sup>r</sup> 1715, relating to Gen<sup>l</sup> Nicholson's ill Behaviour there.

Rece'd from Col. Vetch.

Reced } Feb 16<sup>th</sup> 1715-6  
Read }

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## VII

EXTRACT FROM LETTER FROM SAM VETCH,<sup>1</sup> LONDON SEPT. 2<sup>nd</sup> 1715, TO BOARD OF TRADE.

"Mr. Nicholson's discouraging, or rather discharging all Trade there to the Inhabitants, and causing keep the Gates of the Fort shutt against them night and day, that they may have no manner of commerce with the Garrison, & having by Ploclamation discharged their harbouring or resetting any of the natives, with whom they used to have a considerable Trade for Peltry, hath so discouraged them from staying that they had built abundance of small vessells to carry themselves and effects to Cape Britton, which was what the French officers so much solicited and threatne'd to do. (How Mr. Nicholson will answer such orders together with his dismantling the Garrison as he did at his coming away and deserting his comand, by coming home without leave, at such an extraordinary Juncture, when ever he heard King George was proclaimed, is what I leave to your Lord<sup>ps</sup> to judge of.)"

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## VIII

EXTRACT OF MEMORIAL FROM L. ARMSTRONG TO BOARD OF TRADE.<sup>2</sup>

"One of the great misfortunes of the Country is that the Inhabitants are French, who having labour'd under very great oppressions and uncertainties have neglected the Improvement thereof, and if a war happens before a suitable number of English Inhabitants are Planted among them. 'tis not doubted but they will take all advantages of any weakness or mismanagement of the Garrison, having refused the oath of allegiance to his maj<sup>ty</sup> King George and now in the time of Peace follow a private Trade for the supply of the French of Cape Bretton with Provisions and other necessaries."

*Endorsed*: Memorial from Captain Armstrong relating to the Present state of Annapolis Royal & the Province of Nova Scotia.

Rece'd }  
Read } 28 Feb. 1715-16

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<sup>1</sup> P. R. O. — Col. Records — Nova Scotia. Vol. II.

<sup>2</sup> P. R. O. — Col. Records — Nova Scotia. Vol. II.

## IX

EXTRACT OF A LETTER FROM SAM VETCH TO BOARD OF TRADE<sup>1</sup> FEB. 21 1715-16 LONDON.

"As to the french Inhabitants In that Country but what I cann learn there is not many of them removed notwithstanding the discouragements they mett withal some time ago and will no doubt gladly remain upon their plantations (some of which are considerable) providing they may be protected and encouraged by the Crown and as no country is of value without Inhabitants so the removal of them and their catle to Cape Brittoun would be a great addition to that new colony so it would wholly ruine Novà Scotia unless supplied by a Brittish Colony which could not be done in severall years, so that the french Inhabitants with their stocks of catle remaining there is verry much for the advantage of the Crown provided it shall be found practicable to keep them faithfull to their alledgeance in case of a war with france, which will be hard to doe while the priests remain amongst them to whose dictates they are absolutely devoted."

*Endorsed:* Memorial from Coll. Vetch relating to the state of Annapolis Royal & Province of Nova Scotia.

Rec<sup>d</sup> 22<sup>nd</sup> Feb }  
Read 28<sup>th</sup> March } 1715-16

## X

LETTRE DU P. FÉLIX PAIN AU GOUV<sup>r</sup> DOUCETTE<sup>2</sup> 29 MARS 1718.

v. † j.

MONSIEUR,

J'ai reçu celle que vous m'avez fait l'honneur de m'escire en datte du cinquième de Décembre mille sept cent dix sept, que M<sup>r</sup> Melansson m'a interprété: J'ay leus avec attention ce qu'elle contient, M<sup>r</sup> Melansson m'a communiqué aussy, la lettre qu'il vous a plût d'escire aux Habitans des Mines, aussi bien que le serment de Fidélité, que Sa majesté de la grande Bretagne Exige des dits Habitans françois de ce Païs, que M<sup>r</sup> Melansson m'a aussi interprété, et m'a remit en main, pour les communiquer, et Publier aux dits Habitans selon votre Désir.

J'aurois eus l'honneur de vous répondre plustost si mon Indisposition dans laquelle j'estois pour lors me l'eut permise;

Pour Repondre donc, Monsieur, à ce que vous me faittes l'honneur de m'escire personnellement, j'auray l'honneur de vous dire, Monsieur, que ces peuples sont suffisamment Instruits, de leurs obligations et de leurs Devoirs, sans qu'ils ayent besoin de mon secours en ce que vous désirez de moy à leurs Egards. je ne suis point icy avec eux, pour entrer dans de si grandes affaires, desquelles je ne me mesle nullem<sup>t</sup>; mais J'y suis seulement pour les maintenir avec Dieu, duquel nous ne pouvons nous séparer, sans attirer en mesme temps sur nous, sa vengeance Divine pour toute l'Eternité;

Comme donc ces peuples sont suffisamment instruits par eux mêmes de ce qu'ils doivent faire sur ce que Sa majesté de la grande Bretagne desire je serois mal Receus si je voulois leur intimer des sentiments contraires à leurs Inclinations, ce que je ne feray jamais. Ainsy Monsieur permettez moy de vous dire afin que vous n'ayez rien à dire de ma conduite dans cette affaire, je suis dans la Résolution de ne leurs donner aucun conseil; n'y pour n'y contre, et comme cela vous reconnoistrez, Monsieur, parfaitement leurs Inclinations naturelles, et la Disposition dans laquelle ils seront véritablement.

A l'Egard de la chéloupe dont vous me parlé, le Bruit cours que les Sauvages l'ont brulée, cepen-

<sup>1</sup> P. R. O. — Col. Records — Nova Scotia. Vol. II.

<sup>2</sup> P. R. O. — Colonial Records — Board of Trade — Nova Scotia. Vol. II.



dant j'en escriray à l'habitant françois qui est à Mirligueche, pour en savoir la verité; il ne me reste plus qu'à vous assurer que j'ay l'honneur d'estre

Monsieur

Votre tres humble Serviteur

F. FELIX PAIN Recollet Miss: ind:

Des Mines

ce 29<sup>e</sup> mars 1718

*Endorsed:* Nova Scotia — The Priests Answer to Cap<sup>t</sup> Doucett referr'd to in Cap<sup>t</sup> Doucetts L<sup>er</sup> of  
20<sup>th</sup> June 1718.

Rec<sup>d</sup> 19<sup>th</sup> Dec<sup>r</sup> }  
Read 10<sup>th</sup> Feb<sup>ry</sup> } 1718<sup>1</sup>

# XI

## GOV<sup>r</sup> DOUCETTE'S ANSWER TO THE PRIEST.<sup>2</sup>

Annapolis Royal, March 26<sup>th</sup> 1718.

REVEREND FATHER,

I am concern'd I did not know of your Indisposition before I received yours by Prudent Robicheau, because my not having a line from you, I judg'd you thought it not worth yo<sup>r</sup> while to answer mine, but now being convinced to the contrary I shall doe you that Justice to believe it was not out of prejudice, which if it had been, from a person of yo<sup>r</sup> parts and sence it would have apeard odious.

As to what you mention of the Inhabitants being sufficiently instructed concerning their Duty and Obligations, I doe not doubt in the Least and for that reason it will be worse taken by his majesty, when people knowing their Duty so well shall refuse to comply with his majesty's demand's in an affair so reasonable, and just.

I think you ae<sup>d</sup> very prudently & according to yo<sup>r</sup> profession, in leaving the People to themselves in Temporal affairs, by which they can lay noe blame on you, if they suffer by acting contrary to reason, and for yo<sup>r</sup> declaration in yo<sup>r</sup> Letter, I shall hence forward Esteem you to be person of Integrity and devoted to yo<sup>r</sup> profession, and shall be proud when any thing may happen in my power to shew you I am

Reverend Father,

Your hum<sup>b</sup><sup>le</sup> Servant

To

Pere Felix at Mines

*Endorsed:* Nova Scotia

Cap<sup>t</sup> Doucett's Answ<sup>r</sup> to the priest

raferred to in his Letter of 20<sup>th</sup> June 1718

Rece'd 19<sup>th</sup> Dec<sup>r</sup> }  
Read 10<sup>th</sup> Ffeb<sup>ry</sup> } 1718

<sup>1</sup> Sic.

<sup>2</sup> P. R. O. — Colonial Records — Board of Trade — Nova Scotia. Vol. II.

## XII

EXTRACT OF A LETTER FROM CAP<sup>t</sup> DOUCETT TO MONS<sup>r</sup> S<sup>t</sup> OVIDE BROUILLAN<sup>1</sup>  
DATED ANNAPOLIS ROYALL MAY 15<sup>th</sup> 1718.

... Thirdly, I must complain that the agreement between the french Inhabitants, and Cap<sup>t</sup> La Ronde Deny's, which not having been comply'd with on your part, has been a great determent to these His Majesty's King George's Dominions, for upon the retireing of those Inhabitants which have sign'd, We might have suply'd their plantations, with his Majesty's Subjects, and otherways if the said Inhabitants had not sign'd to an agreement of retiring, upon the promises of Monns<sup>r</sup> Pensance and Cap<sup>t</sup> La Ronde Denys to provide for them and family's, they would doubtless have all declar'd themselves subjects to the Crown of Great Brittain according to the 12<sup>th</sup> article of the Late peace Sign'd att Utrecht, wherein his late most Christian Majesty yeilds and makes' over all the French Inhabitants to her late majesty and to her Crown for Ever, as well as all Nova Scotia with its antients, Boundarys &c; I therefore expect since the above said agreement between Cap<sup>t</sup> La Ronde Denys, and the Inhabitants has not been perform'd, in the time allow'd by her late majesty for their retireing out of this Country; it may be annull'd & made Void, if the Inhabitants desire the same, but if any of them shall not desire to alter their agreement with Cap<sup>t</sup> La Ronde Deny's. That then you will please to give directions, and provide for their retireing into his Most Christian Majestys Dominions, as speedily as may be, To all which I with Impatience wait the Honour of your answer, to remitt home to the King my master...

## XIII

EXTRACT OF A LETTER FROM M. ST. OVIDE DE BROUILLAN<sup>2</sup> DATED LOUISBOURG 21<sup>st</sup> JULY 1718.

A L'Esgard des plaintes que vous me faites que les Habitans de l'Acadie ne s'estant point retirez comme l'on en Estoit convenu et que ce Retardement a causé de la Perte a sa Majesté Bretanique, Vous avez deus sçavoir monsieur L'Impossibilité dans laquelle monsieur De Nikelson Et autres commandans de la Cadie les ont mis de pouvoir Executer les conventions que l'on avoit fait, les vns en ne voulant pas leur laisser emporter Leurs Biens, Et les autres, n'ayant voulu permettre, qu'il leur feüs par nous Envoyé des apareaux pour Gréer les petits Batiments qu'ils avoient construits et dont ils ont étez obligez de se Desfaire presque pour Rien aux marchands anglois, je ne manqueray pas d'Informer Le Roy mon maitre de tout ce que vous me marquez sur cella, affin qu'il y donne les ordres qu'il jugera à Propos.

(This letter in answer to one from Cap<sup>t</sup> Doucett of May 15<sup>th</sup> 1718.

## XIV

G. R.

## PROCLAMATION

*Par Son Excellence Richard Philipps Escuyer, Capitaine General et Gouverneur en Chef de la Province de sa Majesté la Nouvelle Escosse ou Accadie, &c.*<sup>3</sup>

Sa Sacrée Majesté George Par la Grace de Dieu, Roy de la Grande Bretagne et d'Irlande &c., Duc de Brunswick et Lunnenbourg, Seigneur de Bremen, Souverain Prince d'Hannover, Prince

<sup>1</sup> P. R. O. — Col. Records — Board of Trade — Nova Scotia. Vol. 2.

<sup>2</sup> P. R. O. — Colonial Records — Board of Trade — Nova Scotia. Vol. 2.

<sup>3</sup> P. R. O. — Col. Records — Nova Scotia. Vol. 5.

Electeur du Saint Empire, Seigneur de plusieurs vastes Domaines en Amérique, et en particulier l'Incontestable Souverain Seigneur de toute la Nouvelle Ecosse, ou Acadie, aussy bien par Traité que par conquête; estant informé que les Habitants François de cette dite Province ou la plus grande Partie d'entreux ont negligé jusque icy de satisfaire a leur Obligation, de jurer veritable et Fidelle allegiance a sa Majesté, quoy qu'ils ayent Jusques icy joui des Influences de son Gouvernement doux et benign (comme ils le confessent eux mesme :) m'a commandé de Declarer et Publier à mon arrivée dans cette Sienn Province, que son Vouloir et Bon Plaisir Royall est que quoy que les dits Habitants, François, ayent par leur obstination ou negligeeance escoulé le temps stipulé pour eux dans le Traité de Paix conclu a Utrecht pour prester le dit Serment ou se retirer de ce pays avec leurs Effets, Sa Majesté cependant par la grande Indulgence, qu'il a pour eux, est portée a ne prendre aucun avantage de leur tel deportement et veut de sa Grace leur donner une autre occasion d'obtenir Sa Faveur Royale, en leur accordant quatre mois de plus, a commencer de la datte de cette Proclamation, pour prendre le dit Serment, Promettant, a tous ceux qui s'y conformeront le libre Exercise de leur Religion et qu'ils jouiront de Droits et Privileges civils comme s'ils estoient anglois, aussy longtemps qu'ils se comporteront comme Bons et Fidelles Subjects de Sa Majesté et que leur Biens et Possessions deviendront a leur Heritiers: mais il est Positivement defendu a ceux qui choisiront de sortir du Pais de faire aucune sorte de dégast ou damage a leurs maisons ou Possessions ou d'alienner, disposer, ou emporter avec eux aucuns de leurs Effets. De quoy toutes personnes qui y sont Intéressées doivent prendre connoissance a leur Peril Donné a Annapolis Royale le Dix<sup>me</sup> jour de Avrill V. S. dans l'année de note Seigneur 1720 et dans la Sixieme année du Regne de Sa Majesté.

VIVE LE ROY

Par ordre de Son Excellence

*Endorsed*: Nova Scotia

## PROCLAMATION

Reced 12 <sup>th</sup> August	} 1720
Read 15 ditto	

In Govern<sup>r</sup> Philipps May 26<sup>th</sup> 1720.

## XV

LETTER FROM P. JUSTINIEN DURAND TO GOV<sup>r</sup> PHILIPPS<sup>1</sup> WITHOUT DATE. (GOV<sup>r</sup> PHILIPPS'  
ANSWER IN PRINT 30 APRIL 1720.)

MONSIEUR,

J'ay executé les ordres de votre Excellence apres avoir assemblé les Habitants, je leur ay lu derechef la Proclamation. Je les ay ensuite exhorté a declarer par escrit leur sentiment et le signer: c'est ce qu'ils ont fait par le présent écrit que je présente a votre Excellence, inclus dans cette lettre. Je vous prie, Monsieur, d'être persuadé que je les ay laissé dans une entière liberté de prendre tel parti qu'ils trouveroient le plus avantageux, si votre Excellenc ne trouve pas a propos d'accorder aux habitans ce qu'ils requerent de vous, je vous prie de me permettre de me retirer à l'isle Royale, afin que l'on ne m'impute pas les troubles qui pourroient arriver. Je suis et seray tout à fait éloigné de fomentier le trouble que je sois loin ou proche ce n'est pas que j'aye la pensée que nos françois ayent envie de remuer, Je leur rendrai toujours cette Justice qu'ils aiment la paix. Mais dans un pais comme celui-ci, ouvert à tous ceux qui voudroient piller et mal faire: le plus court est d'en sortir

<sup>1</sup> P. R. O. — Col. Records — Board of Trade — Nova Scotia. Vol. 3.

promptement quand on y pretend plus rien. Je vous prie de croire que je suis avec un très profond respect Monsieur

de votre Excellence

Votre tres humble et tres obeissant serviteur

fr: JUSTINIEN DURAND,

Recollet indigne.

Directed } To Richard Philipps Esq<sup>r</sup> Captain general & Governor in Chief in & over His Majesty's  
in french } Province of Nova Scotia &c<sup>a</sup>.

Vera copia

Attested

p A<sup>r</sup> Savage Sec<sup>ry</sup>

Endorsed: N<sup>o</sup> 2. Answer of Father Justinien Durand to Coll Philipps's Order for reading the Proclam<sup>n</sup>.

In Govern<sup>r</sup> Philipps of 26<sup>th</sup> may 1720

Rece<sup>d</sup> w<sup>th</sup> Mr Delafray's Lr. of 9<sup>th</sup> aug<sup>t</sup> 1720

## XVI

### MEMORIAL TO GOV<sup>r</sup> PHILIPPS.<sup>1</sup>

*A Son Excellence Richard Philipps Gouverneur d'Annapolis Royal*

*Nouvelle Ecosse et Acadie, Plaisance Ile de Terre Neuve.*

Pour repondre à celle qu'il a plut a Son Excellence nous envoyer au haut de cette Riviere par le Sieur Bradstreet lequel apres avoir fait assemblé tous les Habitans a la porte de l'Eglise nous en a fait la lecture par laquelle Son Excellence nous fait connoistre qu'ils n'est pas apropos que les six Deputez qui ont ettés nommée de la part de tous les Habitants puissent bien Regler avec luy ou gens nommé de sa part d'autant qu'il faut entirer deux d'entre les six et en remetre deux autre, c'est ce que nous ne pouvons faire, d'autant que cest les six les plus apropos que nous avons trover entre nous et en autant les deux nommée par Son Excellence les quatre deputez avec eux veulent aussy en sortir c'est pour quois nous vous prions tous d'une commune voy de vouloir Bien nous accorder du dellest jusque a ce que les deux hommes que nous allons envoyer a l'Isle Royale par la permission que vous avez bien voulu nous accorder a celles fin de consulter Mons<sup>r</sup> le Gouver<sup>r</sup> de l'Isle, et que nous puission prendre nôtre derniere Resolutions pour nous retirer d'Icy ne pouvant absollument prendre le serment que l'on nous demande et quil est absollument de notre interest a tous d'envoyer incessamment pour avoir des voitures n'ayant point eu de Reponce de la requeste que nous avons pris la liberté de représenter a vostre Excellence cest la grace que nous espérons que vous accorderez a tous ceux qui sont avec tout le respect et la soumission possible

les plus humble et les plus soumis des vos serviteurs.

Les soubssignés et soubz marquez Annapolis Royal ce 20<sup>e</sup> may 1720 N. S.

Abraham Bourg  
Fouggeris  
L. Langlois  
Jaque Bomont  
François Comois  
Renot Babinet

Jean Breaux  
Bennett Godett  
Jean le Prince  
François Mitchel  
Charle Blanchard  
Piere Lanou

Jean Baptiste Leuvon  
Mich<sup>l</sup> Tibedeau  
Piere Richard  
Charles Doucett  
Alexander Hebert  
Alexander Richard

<sup>1</sup> P. O. R. — Col. Records — Nova Scotia. Vol. 3.

Charles Belliveaux	Guillam Blanchard	Clement Vincent
Pierre Olivier	Deny St Sceine	Claud Mellenson
Jean Heber	Piere Blanchard	Jean Baptist Landry
Claud Doucett	Laurence Grange	Rene Martin
Nich La Vigne	Jean Breaux	Jacques Leger sen <sup>r</sup>
Nich Richard	Ambroise Mellanson	Jacque Leger jun <sup>r</sup>
Pierre Godett	Antoine Tibedeaux	Jean Commeau
P. Tipodeau	Charles Tibedeaux	Pierre Commeau
An : Blancheau	Francis Scavoy	Jacques Leveran
Laver Dure	Mark Peter	Antoine Brown
Pierre Rich <sup>d</sup>	Abram Commeau	Francis Bastarack
Rene de Morrut	Jacques Girrerd	Jean Bastarack
Chu. Mallenson	Jean Dupuis	Joseph Robicheau
St Seine	Charle Belleveaux	Jean Priejean
Claud Tibedeau	Piere Mellanson	Charle Martin
Jeau Mellanson	Abram Burg	Alex <sup>er</sup> Gerrard
Alexander Commeau	Francis Robicheau	Antoine Hebert
Jean Baptist Pibrain	Jean Belleveau	Renne Breaux
I. Duon	Pierre Commeau	Renne Blanchard
Jos. Burgois	Jean Scavoy	Piere Broisard
Bar <sup>d</sup> Godett	Jacq : Hebert	Glaud Burge
Claud Landri Sen <sup>r</sup>	Claud Dugay	Germain Scavoy sen <sup>r</sup>
Gabriel Samson	Pierre Anbois	Jacq : Mitchel
Pierre Pouget	Antoine Belleveaux	Mathew Doucett
C. Landri jun <sup>r</sup>	Claud Breaux	Clem <sup>t</sup> Bibenot
An. Simon	Francis remose	La vieuf LeBlan
Ber. Pelfrain	Claud Peter	Le vieuf Brossard
Ger. Savoy Jn <sup>r</sup>	Claud Grange	La vieuf Doucett
Piere la Vergne	La vieuf Richard	Guillaum Garrerd
Piere Doucett	Augustine Commeau	William Godett
Alexandre Pibrain	Tous les Veuve sont du meme sentiment	
Jacque Gouzille		

vera copia

Attested p A<sup>r</sup> Savage Sec<sup>ry</sup>*Endorsed:* In Govern<sup>r</sup> Philipps of 26<sup>th</sup> May 1720Reced with M<sup>r</sup> De la fay's L<sup>r</sup> of 9<sup>th</sup> Aug<sup>t</sup> 1720

Reced 12 <sup>th</sup> Aug <sup>st</sup>	} 1720
Read 15 <sup>th</sup> ditto	

## XVII

ANSWER OF THE FRENCH INHABITANTS IN NOVA SCOTIA TO COL: PHILIPS.<sup>1</sup>

A Son Excellence Richard Philipps Escuyer Capitaine General et Gouverneur en Chef de la Province de sa Majesté La Nouvelle Escosse ou Acadie. Gouverneur D'Annapolis Royale dans la ditte Province et de Plaisance en terre nevue Et Collonel d'un des Regiments D'infanterie de sa Majesté.

<sup>1</sup> P. R. O. — Col. Records — Nova Scotia. Vol. 3.

Pour executer vos ordres nous nous somme assemblé, tous les Habitants de cette Riviere pour donner a Votre Excellence vne Reponce Positive a la Proclamations que vous avez eue la bontée de nous envoyer, nous Representons donc tres humblement a votre Excellence quil est notoires que nous ne pouvons pas prester serment a sa Majesté Britannique sans courir un Risque tres certain D'estres Esgorgée dans nos maison par les Sauvages les quel nous en menaco tous les jour c'est pourquois Monsieur nous ne pouvont pas faïres D'autre serment que ce luy cy, qui est d'estre fidelle au Roy George sans que l'on nous puiss<sup>e</sup> contraindre a prendre les armes contre Personne, dont nous vous suplions tres humblement de vouloir l'accepter vous prommettant de le garder fidellement Votre Excellence verra bien que ce sont le Sauuage que nous aprehendons doutant que nous somme tous prest d'abandonner tous nous bien pour nous sauver nôtre vie a nous et a nos familles et sy vôtre Excellence ne nous peut pas permettre de rester icy sur ce serment nous vous suplions tres humblement Monsieur de vouloir bien nous accorder vn peu plus longtemps pour nous retyrer nous et nos familles nous estant presque impossible de nous retyrer en sy peut de temps le pays même estant denuée de vivres par les semences que long a faitte De puis peut, c'est pour quois, nous vous prions de vouloir Bien nous accorder la grace de nous lesser enporter les effects que nous avons pour substantier a notre vie et a celle de nos familles pour nous retirer sur les terre du Roy de France Esperant que Votre Excellence nous permetra d'aller a L'Isle Royal pour demander du secours pour nous retyrer. Nous estant impossible de nous retyrer de nous même en sy peut de temps, la plus grande partie n'ayant aucune voitures nous esperons que votre Bontée nous permetra a ceux qui aurons des voytures de se Retyrer avec, où qui leur serat permis den Lover ou den achepter. C'est la grace que nous esperons que vôtre Excellence accordera a tous ceux qui sont avec tout le Respect et la soumission possible. Les plus soumis de vostres humble serviteur

Les Soubsignez ou sou marquez

NICHOLAS LAVIGNE  
and 135 Inhabitants french  
their names

Signed

vera copia

Attested

p A<sup>r</sup> Savage Sec<sup>ry</sup>

Endorsed: In Gover<sup>r</sup> Philipps of 26 may 1820

# XVIII

## EXTRACT OF A LETTER FROM M. O. DE BROUILLAN TO PHILIPPS<sup>1</sup> 8 JUNE 1720.

Le P. Justinien m'apprend Les ordres precis que vous avez donnés (*aux*) habitants de l'Acadie de prester le Serment ou de se retirer, c'est apparemment ceux que vous entendez natifs du pays dont vous me parlez dans votre lettre; J'ay Egalement taché lorsque l'occasion s'en est présentée de leur inspirer l'Esprit de tranquillité du mieux qu'il m'a esté possible cependant Monsieur quelque juste que soit la resolution que vous avez prise de les fixer en consequence des Ordres Expresses du Roy vostre maistre, vous voulez bien me permettre de vous représenter que L'inaction dans laquelle ces peuples sont restez jusqu'a present ne peut ni ne doit leur estre imputé a crime tant par raport au deffaut des Secours essentiels a leur transmigration que par les obstacles que les Gouverneurs généraux et particuliers qui vous ont précédé y ont mis.

Jé ne puis non plus me dispenser Monsieur de vous exposer que les deux clauses de vostre Proclamation qui concernent le terme, et les circonstances de leur Evacuation me paroissent peu conformes

<sup>1</sup> P. R. O. — Col. Records — Nova Scotia. Vol. 3.

aux assurances de bien veillance qu'ils auoient de la part de la Cour d'Angleterre surtout après un Traitté et une Convention de bonne foy entre la feu Reyne Anne et le Roy Louis quatorze de glorieuses memoire, Traitté qui a esté executé en Entier de la part de la France et en partie de la part de l'Angleterre.

Vous n'Ignorez pas Monsieur que par cette convention Le sort des Habitants de L'Accadie estoit et deuoit estre meme que celui des habitants de Plaisance. On ne peut rien adjouter a la gracieuseté et a la bonne Foy avec laquelle cest Traitté cette Evacuation et j'auray l'honneur de vous représenter que rien ne pourroit estre de plus dur que l'Extremité ou pour mieux dire l'Impossibilité à laquelle se trouveroient reduits ces pauvres Peuples Si vous ne vouliez vous relacher en rien du temps que vous leurs accordez et de la maniere dont vous Exigez leur sortie.

En verité Monsieur ce seroit leur faire sentir bien foiblement les effets de la bien veillance Royale du Roy vostre maistre que vous leur faites valoir avec tant et de si justes Tiltres dans votre Proclamation et dont Ils auoient de si heureux préjugez par le Traitté et la Convention dont vous ne pouvez ignorer ni les clauses ny le poids.

Je suis persuadé Monsieur qu'en considération de cette sincere, indissoluble et inviolable Union qui se trouve entre les Roys nos maîtres et leurs Etats, vous ne refuserez pas L'attention convenable a La representation que j'ay l'honneur de vous faire et que trouvant a l'avénement a votre Gouvernement l'heureuse occasion de faire valoir la forte inclination que vous me protestez auoir de vous y conformer en tout ce qui pourra dependre de vous vous me donnerez les occasions d'y repondre en Faisant valoir au Roy mon maître l'humanité avec Laquelle vous aurez traité Ses sujets en cette importante occasion.

J'ay l'honneur d'Estre tres parfaitement

Monsieur

Vostre tres humble et tres  
obéissant Serviteur

ST OVIDE DE BROUILLAN.

*Endorsed* : Nova Scotia — Letter from Mons<sup>r</sup> St. Ovide Gov<sup>r</sup> of Cape Breton to Col. Philips.

Dated 8<sup>th</sup> of June 1720

Recd. his L<sup>er</sup> of 6<sup>th</sup> Aug<sup>st</sup> 1720

Recd. 26<sup>th</sup> Nov. 1720

Read 1<sup>st</sup> Dec. 1720

NOTA. — Les Documents ci-dessus, depuis XII jusqu'à XXIX inclusivement, ne se trouvent pas dans le volume d'*Archives de la Nouvelle-Ecosse*.

## XIX

EXTRAIT D'UNE LETTRE DES HABITANS DU PORT ROYAL, DES MINES, DE BEAUBASSIN, ENVOYÉE A M<sup>r</sup> DE S<sup>t</sup> OVIDE PAR DES HABITANS DÉPUTÉS DE LEURS PART. <sup>1</sup>

MONSIEUR

Le nommé Prudent Robuchau vous remettra la lettre que nous avons l'honneur de vous écrire, nous l'avons député pour vous informer qu'un nouveau lieutenant-gouverneur étant arrivé nous avons reçu ordre de lui de faire le serment de fidélité pour le roi de la G. B. ce que nous avons refusé avec autant de constance que nous le fimes les années dernières au général de Nicholson en présence de M<sup>rs</sup> de la Ronde et de Pensens.

<sup>1</sup> *Archives du Ministère de la Marine et des Colonies*, Paris. — "Colonies" Ile Royale. — Correspondance générale. — Année 1718, vol. 3, fol. 179.

Vous savez M<sup>r</sup>, les difficultés qui nous ont été faites pour notre sortie lorsque nous l'avons demandés et l'impossibilité dans laquelle nous nous sommes trouvés d'effectuer ce que l'on demandait de nous. Cependant aujourd'hui il semble qu'on veuille nous contraindre de faire ce serment ou d'abandonner le pays il nous est absolument impossible de faire ni l'autre.

Nous sommes résolus de ne point faire de serments parce que nous sommes bons et vrais sujets du roi T. C. Vous avez veû la dessus notre déclaration que rien ne sera capable de nous la faire changer et nous ne pouvons abandonner sans des facilités convenables qui nous étoient promis de la part de la cour de France et qui nous ont été toujours refusez de la part de la cour d'Angleterre. pour notre situation est très rude et que la conjoncture dans laquelle nous nous trouvons est très épineuse, nous vous supplions Monsieur de nous honorer de vos charitables conseils au cas qu'il nous soit fait de nouvelles instances de la part du gouverneur, nous en ferons le meilleur usage qu'il nous sera possible avec le secours de nos missionnaires.

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## XX

DEMANDES QUE L'ON SUPPOSE QUI SERONT FAITES AUX D<sup>cs</sup> HABITANS AVEC LES RÉPONSES ENVOYÉES PAR M<sup>r</sup> DE S<sup>t</sup> OVIDE AUX MISSIONN<sup>res</sup> POUR ÊTRE COMMUNIQUÉS AUX PLUS FIDÈLES AU CAS ET BESOIN.<sup>1</sup>

Il sera sans doute demandé pourquoi ils refusent de faire le serment de fidélité pour le roi d'Angleterre.

R. — Qu'ils en ont fait un depuis la paix pour le roy de France leur légitime prince en présence du général Nicholson et de deux officiers françois lequel serment rien ne peut empêcher de tenir.

D. — Quelles raisons ils ont pour être resté jusqu'à présent sur les terres du roi d'Angleterre et pourquoi ils n'en sont pas sortis dans le cours de l'année.

R. — Qu'il leur a été impossible de le faire par plusieurs raisons.

La 1<sup>e</sup> par la déffense qui nous a été faite par M. Calild de ne rien emporter de tout ce qui nous appartenait, ce qui est contre l'article 14<sup>e</sup> de paix, où il est porté que les sujets du roi de France pourront se retirer avec tous leurs effets mobiliers pour se transporter où bon leur semblera, et suivant une lettre de la reine qui accorde que nos biens et maisons seront estimés par des comm<sup>res</sup> dont le montant nous sera payé comme cela a été pratiqué à l'évacuation de Plaisance et autres endroits cédés à la reine d'Angleterre par le roy de France.

Qu'en second lieu le général Nicholson ne voulant point consentir qu'il vint des vaisseaux françois pour nous transporter ny nous en fournir il ne voulut pas non plus qu'il nous fut envoyé des agrés et aparau qui étoient à l'isle Royale pour gréer nombre de petits bâtimens que nous avions dont nous nous serions servis pour nous retirer lesquels nous avons été contraints de vous vendre.

D. — Qu'il a ordre du roi son maître de savoir leur volontés afin que sur leur réponse il puisse prendre les mesures qui conviendront.

B. — Qu'ils sont tous dans les mêmes sentimens qu'ils étoient lorsque pareilles propositions leur furent faites par le général Nicholson, de laquelle intention rien dans le monde ne peut les détourner, voulant mourir catholique, romain, et sujets du roi de France comme ils ont toujours été.

D. — Je suis bien aise de vous dire que les instructions du roi mon maître sont de vous ordonner de sa part, que ceux qui auront ds pareils sentimens ayent a sortir de dessus ses terres dans l'espace d'un mois au plus sous peine à ceux qui y seront au dela de ce temps d'être punis, ou leurs biens confisqués.

R. — Nous sommes tous prêts a exécuter de bon cœur l'ordre que vous nous donnerez sur cela,

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<sup>1</sup> *Archives de la Marine*, Paris. — Ce document fait suite au précédent (No XXX) et faisait probablement partie de la réponse demandée.



lorsque vous accomplirez comme vous le devez l'article 14 de paix, et la lettre de la reine de la G. B. l'un et l'autre dans leur teneur, si vous croyez M. que ce que nous avons l'honneur de vous représentez ne soit pas de la dernière justice et équité, nous vous offrons nos réponses par écrit signées de tous, nous, et vous aurez la bonté de nous faire donner nos demandes afin que vous et nous puissions les envoyer a nos Cours pour en être par elles décidés.

ST OVIDE DE BROUILLAN.

## XXI

Mr MORRIS' REMARKS <sup>1</sup> CONCERNING THE REMOVAL OF THE FRENCH INHABITANTS. <sup>2</sup> Summer 1755.

IN JULY OR | Some Reflactions of <sup>3</sup> the situation of the Inhabitants commonly called Neutrals, EARLY IN AUG<sup>t</sup> | and some methods proposed to prevent their escape out of the Colony, in case upon being acquainted with the design of removing them, they should attempt to desert over the French neighbour<sup>s</sup> settle<sup>ts</sup>, as their firm attachm<sup>t</sup> to them may be conjectured to raise in them a strong effort <sup>4</sup> to attempt it

As to their situation.

MINAS | The greatest district which comprehends the most families is that of Minas, to whom belong the Inhabitants of the Gaspero, In 1748 they were reported to be in number upwards of 200 families, of w<sup>h</sup> 180 families live at Minas, 30 on the Gaspero, & about 16 in two small Villages on the River Habitant. These all dwell within the compass of six miles, and occupy for their livelihood <sup>5</sup> those marishes which are situated on the Bason of Minas called Grand Pré, on the north of the River Habitant and on the river Gaspero.

CANARD | The river Canard settlement lies to the South West, and contains about 150 families, of whom 50 live on a point of land, lying between the river Habitant & the river Canard, 60 live on the west side of that river in a compact village about two miles from its mouth, & 25 more up the river along the banks on both sides, (for the convenience of the marish) to Penus Mills which are near the road coming from Annapolis to Minas & distant from Grand Pré 9 milles, from the mouth of the Canard to the River of the Vieux Habitant are settled about 10 families & 4 or 5 families more at the river Pero. All these inhab<sup>ts</sup> have by the River afores<sup>d</sup> a communicat<sup>n</sup> by water with the bason of Minas and some live contiguous to it.

<sup>1</sup> *British Museum*. Dr A. Brown's MS Papers relating to Nova Scotia, 1748-1757 — *Add. MSS* 19,072. Petit 4<sup>to</sup>, fol. 30 à fol. 38.)

Le docteur Andrew Brown, natif d'Ecosse, était un ministre presbytérien, venu à Halifax en 1787. Il y résida jusqu'en 1795, qu'il retourna en Ecosse, où il succéda au docteur Blair dans la chaire de rhétorique de l'université d'Edimbourg. Pendant son séjour dans la Nouvelle-Ecosse, il réunit des matériaux pour faire une histoire de cette province. Cette histoire, inachevée et restée manuscrite, fut trouvée, avec tous les documents originaux et autres qui l'accompagnaient, dans une boutique d'épicier, et achetée, le 13 nov. 1852 par M. A. B. Grosart, de qui elle fut acquise par le *British Museum* de Londres.

<sup>2</sup> This paper was digesty (*sic*) in July 1755 — at the period when the measure was first proposed — probably before it was sanctioned in Council by the approbation of Boscawen & Mostyn. (Note sur le manuscrit de la main du docteur Brown.)

M. Grosart a écrit en tête du manuscrit: "This invaluable Paper was drawn up by Judge Morris early in 1755."

La première partie de ces *Remarks*, laquelle est purement descriptive, a été publiée dans les "Collections of the Nova Scotia Historical Society," vol. 2, pages 158-160. Mais le reste du document est tellement important que nous croyons devoir reproduire la pièce tout entière.

<sup>3</sup> *on* (Note de la main du Dr Brown).

<sup>4</sup> *desire* (Note de la main du Dr Brown.)

<sup>5</sup> *subsistence* (Note de la main du Dr Brown).

**PIZAQUID** | Pizaquid is a settlement South Easterly of Minas. They are scattered in many small Villages the principal of which are those settled on the river Pizaquid above the confluence of the river S<sup>t</sup> Croix with it, on the river S<sup>t</sup> Croix. These are situated between Fort Edward & the district of Minas, and southerly towards the road leading to Halifax. A few small villages belonging to this district are to the East & Northward of Fort Edward, and a few families at Cape *Fondu*<sup>1</sup> which makes the east head of the great river of Pizaquid. These have all communication by water with the Bason of Minas, & are in the whole upwards of 150 families.

**COBIQUID** | Cobiquid, it is at present uncertain as to the number of inhabitants, as some have quitted that settlement and gone over to the north shore but the several settlements in 1748 were as follows — on the south side of Coopegate Bason, Petit Riviere 4 families, Vill<sup>e</sup> Noel 7 families, Village Robere 4 families — these are west of the Subnaccada; upon the river Subnaccada, two small Villages, one near the mouth, on the west side, the other on the East side near the confluence of the *Shenarack*<sup>2</sup> River 14 families: East of the Subnaccada, Vill<sup>e</sup> Perce Burke 8 families, Vill<sup>e</sup> Condé 7 families (in a later copy 10 families) Vill<sup>e</sup> Michael Oquin 10 families. These are all the families south of the Bason in an extent of seven leagues. On the north side of the Bason Vill<sup>e</sup> Jean Domet (Doucet?) 4 families behind Isle Gross; 4 families at Point Conomé; from thence to Vill<sup>e</sup> <sup>3</sup> Jean Burke, 3 leagues east called Vill<sup>e</sup> Burke 12 families; thence one league to Cove d'Eglise where is 7 families,  $\frac{1}{2}$  league further is the river Chaganois where are 15 families: — by this river is one passage by which they go to Tatmagoush, which is a port on the Gulph of S<sup>t</sup> Lawrence distant from these houses 30 miles, 12 miles of which they go by water on the river Chaganois, between this & the head of Coopegate Bason, which is 2 leagues, dwell about 20 families more. The extent of these north settlements is near 12 leagues: all these have a communication with the Bason of Minas. To this district belonged two small settlements at Tatmagoush 12 families and 3 miles westward at Ramsheek 6 families. The whole number of families in Coopegate district 142 families.

**ANNAPOLIS** | The district of Annapolis contains about 200 families: they live on both sides of the river from Goat Island to the distance of 24 miles according to the course of the river, in small villages, the biggest of which is Bell Isle 10 miles above Annapolis where are about 25 families. All these Inhabitants live near the banks of the river & have no settlement back.

The passages<sup>4</sup> by which they may desert the Colony, and the means of blocking them up.

**INHABITANTS OF ANNAPOLIS HAVE 2 WAYS** | The Inhabitants of Annapolis have but two ways: 1<sup>st</sup> by water through the Gut of Annapolis to the North shore; 2 by land. — But if they attempt it by land, they must first come to Canard, Minas, or Pizaquid. — One of the Sloops in the Government service with whale boats anchored at the mouth of the Bason of Annapolis would effectually prevent their escape by water.<sup>5</sup>

**CANARD PIZAQUID MINAS & COBEQUID** | From the Bason of Minas they must pass either thro' the Gut or pass over to the river Cheignecto on the other side of the Bason near the Gut, where is a communication by water by two rivers, & a small carrying place unto the Bason of Cheignecto.

Another Vessel anchored in Cove Sabelist would prevent their going either out of the Gut or into that river, because they must pass near them.<sup>6</sup>

The other passages by water must be into Cobequid Bason to the river Cheganois, a plain beaten road to the Inhabitants on one of the rivers of Tatmagoush, & thence to Tatmagoush & from that village by a road cut by M<sup>r</sup> Le Corn 1746 to the Bason of Cheignecto, distant from thence about 40

<sup>1</sup> *Fondu* (Note de la main du Dr Brown).

<sup>2</sup> *Stewiack* (Note de la main du Dr Brown).

<sup>3</sup> *Village* (Note de la main du Dr Brown).

<sup>4</sup> Passages for escape. (Note de la main du Dr Brown).

<sup>5</sup> & the road by land is almost if not altogether impracticable for families, Cattle, & Effects. (Note de la main du Dr Brown).

<sup>6</sup> & could easily be prevented. (Note de la main du Dr Brown).

miles or else to the head of the Bason to what is called Cobequid Village. These are the only known passages of communication the Inhabitants have through the country; from the peninsula to the north shore & from the Inhabitants of Minas &c. to St John's Island. As it may be necessary to have a strong party to apprehend the Inhabitants of Cobequid, who have always been the most disaffected, and who, if any of this side the Isthmus are to be suspected, of making a resistance — it is they; especially if they know of any other safe ways for an escape which are at present unknown to the English. If the body of that party were stationed<sup>1</sup> at the river Chaganois & at vill<sup>e</sup> Coopequid they would prevent their escape in their usual passages & that might perhaps so disconcert them as to oblige them to submit. This station would also serve to apprehend those who may attempt to go from the other west settlements, as those of Pizgate Minas &c.

If the western Inhabitants, those of Pizaquid, Minas &c., attempt to remove their stock, there is but one passage they can effect it by; they must cross the road between fort Edward & fort Sackville first, in some place where the river St Croix is fordable, & then parties patrolling along that river to the great lake would deter them, but if they should by chance pass these, & it should be judged necessary, a party may be detached after for they would be very slow in their march, for they must pass again between the river Stewiack and the Grand lake of Shubenaccada, that river not being fordable safely but in a drought till you are above the Stewiack, and through these passages they must pass, if they carry off their cattle, whether they intend for Cobequid or the Eastward, if for Cobequid they must be obstructed by the detachment at Chigonois, or for Cape Breton, for thither the Indians may conduct them in the summer season, & if they take their stock with them they can easily subsist themselves: if they take this course it must be with an intent to cross the Gut of Canso for Cape Breton, if they should arrive there, the inhabitants are provided with a great number of small boats wherewith they carry on their fishing, and could easily transport them.

STATION<sup>2</sup> | A Ship stationed at the Gut of Canso would prevent their passing over, and at this time would be well stationed to prevent provision or recruits going from Canada or St John's Island to St Peter, from whence they can be easily carried to Louisbourg, and it is most likely they will attempt to relieve it through the Gut of Canso, because of His Majesty's Ship at present cruising before Louisbourg, & in the East passage of St Lawrence's Gulph.

CHIGNECTO | As to the Inhabitants of the North Shore as they dwell in that part of the Country DISTRICTS &c.<sup>3</sup> | lying between the English fort & Canada, there are several ways they may pass & English troops cannot well prevent it. The western & common passage to Canada is by the river Patcootycak, which is navigable for boats within 6 miles of St John's River, which is a carrying place; & some settlements of Inhabitants, from thence up St John's river navigable for boats up to the Lady mountains, thence 10 miles carrying places to a river emptying itself into Canada river. This passage is well known to them; they have gone express from Cheignecto & reached Quebec in 7 days,<sup>4</sup> *and most all the grown people have gone the way to Quebec to the Bishop for confirmation.* The Bay of Vert being stopt they have still another passage open to Chediac which lies north westerly of *Munenrooncook*<sup>5</sup> distant about 10 leagues. At this post there live a few Inhabitants & here they land and distribute their Guns, Stores &c<sup>a</sup> to the Indians. There is a constant intercourse between this Post & the inhabitants of Gaspé. At Gaspé, which makes the South entrance into the river St Lawrence, the French have fort & town, & carry on a considerable fishery, here they have Ships & other Vessels, which could with ease carry them from Chediac to Gaspé & from thence to Canada by every Vessel bound thither, for the Vessels bound to Canada frequently touch at that Port, if they should attempt to pass that way His Majesty's Ship cruising in the bay Vert by stretching above the port of

<sup>1</sup> Advice too well fold<sup>d</sup>. (Note de la main du Dr Brown).

<sup>2</sup> Note en marge, de la main du Dr Brown.

<sup>3</sup> Note en marge, de la main du Dr Brown.

<sup>4</sup> The route of Expresses, but not of families. (Note de la main du Dr Brown).

<sup>5</sup> *Memramcoop*. (Note de la main du Dr Brown).

Chédiac would stand a fair chance to intercept them. — As these Inhabitants<sup>1</sup> are so far out of the way of the English troops it will be difficult to apprehend them, but by some stratagem. But they are at all adventures to be rooted out,<sup>2</sup> and the most effectual way is to destroy all these settlements by burning down all the houses, cutting the dikes, and destroy<sup>3</sup> all the Grain now growing, for it will be impossible to save any of their grain, except that growing near the fort, without great loss of men unless there be a firm peace with the Indians<sup>3</sup> which is not likely while the French continue there, and the Indians will be always induced to listen to them, because their dependence for provision will be on them<sup>4</sup> a manifest advantage will arise therefrom<sup>5</sup> for all the Indians on the North shore will then be obliged to depend on the English for subsistence, & we shall find them after this not only in a disposition to make peace but to continue it, especially if a Truck house were established at Cheignecto to supply them with all necessaries, & another at St John's for that tribe. And I cant help remarking that the most lucky conjuncture has happened to put in execution such a project: the fort the French have forsaken<sup>6</sup> is not so damaged but it may be repaired in a few days, & when made defensible 40 men would be sufficient to guard it, for it would not be in the power of the French ever to bring cannon or other stores of war to retake it, for tho' St John's river is navigable for Canoes almost to its head, yet it is full of falls, & they can only use birch Canoes, which can be carried on men's Shoulders till they pass a fall: that the carrying place between the two rivers is ten miles over very steep mountains and impassible but on foot, and therefore they never can bring warlike Stores that way to annoy that Garrison, & a few men would be able to defend it. against any musquetry & could soon be relieved if<sup>7</sup> attacked from the other Post in the bay: this would be a great curb on that tribe<sup>8</sup> and the advantages of plenty of provisions and other supplies will soon gain them to our interest, & this, in time, would become a trade of considerable<sup>9</sup> profit to this Colony.

If this were done before the Inhabitants were removed it would cut off all hopes of escaping there especially to those of Annapolis, and from the circumstances that fort is in at present as I am informed, one Sloop load of Picquets with some plank for Gate,<sup>10</sup> would effectually repair it, & for the present till barracks or two or three of the houses of the inhabitants could be sent, the Soldiers might lodge in tents with one large one or a few boards to cover their stores.

NUMBER OF TROOPS NECESSARY TO EFFECT THE MEAS <sup>r</sup> 12		The number of men necessary to remove the Inhabitants, and the places to post them <sup>11</sup> will depend much on the behavior of the French & it will much facilitate their readiness <sup>13</sup> to go if a persuasion could obtain among them that they are to be removed to Canada <sup>14</sup> — could it be propogated by common report for 'tis natural to think they will be unwilling to quit their possessions, & to offer themselves willingly <sup>15</sup> to be transported they know not whither. I apprehend such a persuasion would greatly facilitate the enterprize. If they can possibly be persuaded to surrender themselves willingly <sup>16</sup> or <sup>17</sup> be apprehended by any stratagem, the others <sup>13</sup> might submit willingly but if they prove obstinate & take to the woods, &
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<sup>1</sup> Difficulties from the situation of the inhab<sup>ts</sup>. (Note en marge, de la main du Dr Brown.)

<sup>2</sup> And advice followed (Note en marge, de la main du Dr Brown).

<sup>3</sup> Necessity of an Ind peace to reap and save the Acad<sup>a</sup> harvest. (Note en marge, de la main du Dr Brown.)

<sup>4</sup> Le Dr Brown met ici un point (.) après *them* et ajoute en interligne les mots: *Besides, a consequential.*

<sup>5</sup> from this measure (Mots ajoutés en interligne par le Dr Brown).

<sup>6</sup> on the river S John (Mots ajoutés en interligne par le Dr Brown).

<sup>7</sup> they were (Mots ajoutés de la main du Dr Brown).

<sup>8</sup> the Marecites (Mots ajoutés par le Dr Brown).

<sup>9</sup> magnitude & importance (Mots ajoutés par le Dr Brown).

<sup>10</sup> Gates &c. (Note de la main du Dr Brown).

<sup>11</sup> Note en marge du Dr Brown.

<sup>12</sup> at (Mot ajouté par le Dr Brown)

<sup>13</sup> resolution (Note de la main du Dr Brown).

<sup>14</sup> Ces trois dernières lignes sont signalées en marge, de la main du Dr Brown.

<sup>15</sup> voluntarily (Note de la main du Dr Brown).

<sup>16</sup> voluntarily (Note du Dr Brown).

<sup>17</sup> If they can (Mots ajoutés par le Dr Brown).

<sup>18</sup> rest (Note du Dr Brown).

take up arms, it will require the whole force in the Colony to subdue them, & take up a considerable time to reduce them : <sup>1</sup> It is difficult to conjecture how this may be effected... <sup>2</sup>

THIS MODE | If strong detachments were placed in the Villages of Minas, Pizag<sup>d</sup> & Canard, at a  
ADOPTED <sup>3</sup> | certain day they might be all summoned to attend, and then seize on all those that  
attend ; or whether to invest their Churches on a Sunday to be agreed on & to seize on all present ;  
or whether to invest their Villages in the night & seize them in bed ; their living in such scattering  
situation will render this difficult ; a number of whale boats would be absolutely necessary if this  
were concluded on to seize all those contiguous to the Bason, which would be best stationed at Minas,  
as being near the centre of the settlements from whence they may be sent out.

In short it is difficult to conjecture how it may be accomplished but the circumstances as they  
arise will afford the best information of the most effectual methods of dealing with them. Happy  
would it be if they in general come in of their <sup>4</sup> accord ?

Is it not possible to employ some person who can be confided in, & who has been among them, to  
sound their present disposition & intention, & from thence to take measures accordingly ? <sup>5</sup>

## XXII

### MODE OF DESARMING THE ACADIANS. <sup>6</sup>

During the siege of Beausejour under the Command of General Monckton while many of the  
Neutrals of the distant districts of Mines Canard Des Habitants Cobequid &c had taken up arms for  
annoying his Majesty's Troops on that Expedition — it was thought advisable to *Draw the Teeth* of all  
the Neutrals in the Province by a seizure of their arms & amunition which in these Parts was  
Effected with great secrecy & Expedition — by a Detachment of 100 men from His Majestys Out-  
Garrison of Fort Edward-Pissiquid joined by another from Halifax consisting of 50 men — marched  
from Fort Edward under the Command of Captain Alex<sup>r</sup> Murray the Commanding officer of Fort  
Edward — reporting among the soldiers & men that they were going to Annapolis Royal and as going  
thither marched about twenty five mile to a Bridge over w<sup>ch</sup> they were to cross and take another  
course into Cornwallis — calculating their time so as to get there about sun sett — leaving at this  
Bridge a Guard of men to prevent any of the Neutrals from passing or repassing & making all  
Prisoners who came with Gun Shot — dividing into several Parties the Remainder of the Detachment  
so as to proceed into Cornwallis by the several Roads that Led to Each Village even to the Remotest  
Part of those several Rivers where there was any settlements *and as had been customary before* lodged  
the men in the French House but with this difference instead of the whole Party lodging in a Barn —  
they separated and two or three men only in a house as tho they meant to lodge there that night  
and by this method every house in all those settlements not only had two or three soldiers in it but  
also every place where they forded the River Centinels were place to Stop & Seize all whom might

<sup>1</sup> But (Mot ajouté par le Dr Brown).

<sup>2</sup> & left to you (Mots ajoutés par le Dr Brown).

<sup>3</sup> Note en marge, du Dr Brown).

<sup>4</sup> own (Mot ajouté par le Dr Brown).

<sup>5</sup>

Halifax Sept<sup>r</sup> 1<sup>st</sup> 1791.

N. B. The subject, it should seem, was referred by the Council to Mr Morris, as best acquainted with the  
Country and the inhabitants. He wrote this report in consequence, little honourable to his heart, as it is replete  
with unjustifiable stratagem, (cruel advice) and barbarous Counsel. His ideas are sound, but was he mild or  
humane ? I found this paper among the Council files relating to the Acadian removal. From it I corrected a less  
perfect copy put into my hands by his son, & from it got this transcript taken. (Note écrite de la main du Dr  
Brown).

<sup>6</sup> *British Museum*. — Dr A. Brown's MS. — Papers relating to Nova Scotia, 1749-1790. — Add. MSS., vol. 19073,  
in-4o. fol. 121.

En tête de ce manuscrit se trouve la note suivante de la main du Dr Brown :

"I have the date of this from a Petition. It occurred about the middle of June. — Mode of desarming the  
Acadians — Judge Deschamps present. One of the partys pretend a fishing frolic on the river.

attempt to pass — the Instructions given to the several commissiond & non commissiond Officers was that at the hour of twelve in the dead of night was to follow & do what the leader did which was to take possession of all the arms they saw or could find in such Houses — this Instruction being strictly complied with they were to march back the same road they went untill they all met at the above mentioned Bridge — in like manner — was done at every House in all the other districts — and the next morning the whole Detachment met together at the Landing Place where Fort Vieux Logis was Erected Each soldiers loaded with Fire arms Powder Horns &c and these arms put on board of a small vessel detained there for the purpose of carrying the fire arms from thence to the Garrison of Fort Edward Pissiquid, that in the course of two days four hundred muskets was thus taken from those Neutrals & secured in Fort Edward — which being done the Governor & Council ordered it to be Published among the Inhabitants and advertizement<sup>2</sup> wrote in French that any family or Person or Persons that had any fire arms remain<sup>g</sup> among them who neglected to bring them into his majesty Garrison of Fort Edward within a limited time should be treated as Rebels to His Majesty — this<sup>3</sup> being done the Neutrals thinking themselves much injured wrote a *very Impudent* letter or writing to the Governor & Council Purporting that while Government continued to allow them the Priviledges that the British Government neither had a Right or in their Power to deprive them of — they would behave as faithful neutrals to His Britanick Majesty. This letter was signed by all the Deputies of this Part of the Province and by most of the Inhabitants & in particular by all the Leading men & a spirit of resentment appeared in the Countenance of Every Neutral French Inhabitant with threats that spoke the temper of their Rebellious minds — the Governor & Council (with the advice of Admiral Boscawen<sup>4</sup> who then had his Squadron at Halifax & was in Council) issued orders that the Deputies and other Signers should be sent to Halifax there to take the Oath of Alegiance to His Britanick Majesty.<sup>5</sup> Some of them did go down in July 1755 but refused to take the Oath of Alegiance every man of them Refused with a most contemptuous look of resentment Wherefore they were all sent Prisoners the Calculation was two to a Ton averaged for Old and young Including Infants as one.<sup>6</sup>

PAINS TAKEN | Great pains was taken to collect families and relations that they might be together in one Ship — and not a day passed without fully informing them of this and of what vessel they were to go on board of and the day when they were to Embark — and the Commanding officers very Earnestly Entreating with them to dispose of such part of their moveables as they had, and to Pack-up their apparell and such other matters as they wished to carry with them, but such was the Phrensy of these People that the greater Part gave themselves no trouble about the matter — conceiving that Government dare not sent them away — and instead of DEFEATED | securing what money and apparel they had to take with them — they filled their Chests with Linnen & other apparel and hid them in the woods — many of them buried considerable ACADIAN | quantity of Dollars in the Earth — & other matters in Wells which were afterwards OBSTINACY &c. | found by the English — no argument or persuasion would prevail with them to believe that Govern<sup>t</sup> DARE send them away. On the day appointed for their Embarkation, many heads of families were missing notwithstanding the great Care to prevent any of the *imprison'd* men from

<sup>1</sup> Judge Deschamps examined... 2900 stand of arms; too many by far. (Note de la main du Dr Brown.)

<sup>2</sup> I have th<sup>s</sup> advertisem<sup>t</sup> a new outrage. (Note de la main du Dr Brown.)

<sup>3</sup> Language of a Coun<sup>t</sup> tho' poor Gray is not of that order. (Note de la main du Dr Brown.)

<sup>4</sup> I am uncertain whether Admiral Boscawen was there that year or not but I think it was Admiral Boscawen who advised in Council to the measure of sending the Neutrals out of the Province & agreed to take all blame on himself. (Note du manuscrit.)

<sup>5</sup> The Oath of Neutrality Required of the French is among the Records in M<sup>r</sup> Bulkeleys Office. (Note du manuscrit.)

<sup>6</sup> Mr Bulkely can furnish you with an Exact List of all the Transports w<sup>h</sup> carried these People away and the number of Neutrals as the Returns was made to him. (Note du manuscrit.)

making their Escape — however great was the trouble and vexation which they gave the Commanding Officer yet every officer of the Garrison Commiserating their situation — persevered with great Patience to collect and have family connections Embark together — but the utmost Efforts could not prevent their separating for after they were Embarked — seventeen of the men made their Escape in one night from on board of one vessel — and more or less from all the vessels during the whole time between Embarking and sailing — some of them would come on board again some days after of themselves & crowd in where others had Embarked to fill up the vacancies of the deserted that it was absolutely impossible to keep familys together, and being then late in the season that every days delay rendered it dangerous — and from the cause above mentioned — Such as was taken before the Sailing of the Transports were put on board of such vessels where desertion made Vacancies for them and was the cause and the only cause why families were separated — or any Branch of the Families separated.

On the 29 Oct<sup>r</sup> 1755 the Fleet saild from the Rendezvous in the Bason of Mines under the Convoy of His Majestys Ship the Nightingale Captain Diggs — the Snow Halifax Captain Taggart — the armd Schooner Warron Captain Adams — with the Transports as follows —

From whom embarked				Tons	Men
Pissiquid	Sloop	<i>Panger</i>	Copt PIERCY	91	182
	Sloop	<i>Dolphin</i>	Capt FARNAM	87	174
	Schooner	<i>Nptune</i>	Capt DAVIS	90	180
	Schooner	<i>Three Friend</i>	Capt CARLILE	69	138
Embarked at Mines & Canard	Sloop	<i>Seaflower</i>	Capt DONNELL	81	180
	Sloop	<i>Hannah</i>	Capt ADAMS	70	140
	Schooner	<i>Leopard</i>	Capt CHURCH	87	174
	Sloop		MILBURY	93	186
	Sloop	<i>Mully &amp; Sarah</i>	HASLUM	70	140
		<i>Mary</i>	DENNY	90½	181
		<i>Prosperous</i>	BRAGDON	75	150
		<i>Endearour</i>	JN STONE	83	166
		<i>Industry</i>	GOODWIN	86	172
			PUDDINGTON	80	160

(N.B. I have made some Blunder by the loss of the Principal List of those who Embarked — but the number of Souls that Embarked on board of these Transports were 2921 — how many embarked afterwards I know not).

The remainder of the Neutrals remaind untill more Transports arrived Thirty days Provisions was Ship<sup>t</sup> on board for Each Soul at the rate of

1lb Beef	p week with Cabbages Turnips Potatoes &c as much as they choose to carry with apples & other matters.
5lb flower	
2lb Bread	

These Neutrals had agreed among themselves that in case they should be sent away — that when they were under sail in the Bay Fundy that they were to rise on the navigators — throw them over board and carry all the Transports into the River St John<sup>a</sup> where they were to Land and defend themselves with the assistance of all the Tribes of Indians — but Providence orderd it otherways At the time of weighing anchor the wind being at East South East — soon blew a Gale of Wind — it overtook them immediately after they passed Cape Porcupine or Blowme down — both men & women became sick unable to move which together with the Darkness of the night prevented their design — and they remained sick untill they were so far in the Ocean as to be out of their knowledge what course to steer when the Storm was over it Blew excessive hard at North West and Winter coming on, that many of the Transports were obliged to send before the wind — untill they made the Land of England and France where some of the Transports did arrive and landed their passengers.



Others went to the southern parts of America & some to the Northwards.

What Instructions the masters of these Transports had in respect to Landing, the Neutrals I know not neither do I know what number were sent from Beau Bassine and Annapolis & other Parts where they were.

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XXIII

LAWRENCE'S CHARACTER.<sup>1</sup>

S<sup>r</sup>

We are extreemly obliged to you for your favour of the 3<sup>d</sup> July last and for your assiduity in our affairs.

We can assure you S<sup>r</sup> that we were allmost without hopes of being considered as English Subjects — the Haughty & disdainfull Behaviour of our Gov<sup>r</sup> to all Remonstrances tho' tenderd with the utmost Submission gave us much reason to think he was countenanced at Home by those whom we had all the Reason in the World heretofore to think were the Patrons and Principal Supporters of this Infant Settlement, and Especially when it was publicly declared by the Governors Creatures That those Gentlemen in Office here who had ever been Solicitous to forward and Promote the Settlement and who had in every Point behaved with Honesty and Integrity Especially the Judges of the Courts of Justice & some of the Council would soon be displaced. The Only men whc have been the means of keeping the Inhabitants from deserting in a Body and Supported the Rights & Libertys of the People.

Your letter has revived the Hopes of the Inhabitants and it has been great comfort to them to find an Englishman in England who has their unhappy State & Condition at heart and commiserates their Bondage under Oppression and Tyranny.

We are sensible of the difficulties in England & the unsettled State of the board of Trade which may retard our affairs — but we are not without hopes thro' your Care and assiduity we shall meet with success in having an Assembly our Native inherent Right soon order'd to be Establish'd here, and we cannot help expressing our Extreme Satisfaction to find that it was the Lords of Trade most earnest Intention to have an Assembly *instantly* settled as we are very sure it is of all things in the world the most necessary step to strenghten and Establish this settlement and Invite Inhabitants to come & settle among us.

We cannot but express our most hearty sorrow that my good Lord Halifax has at this Critical Conjuncture resign'd his Place at that board. We are all to a man perfectly assur'd of that good Lords sincere attachment to the Interest of the Colonies and look upon him truly as the father of this Colony and are fully perswaded that he will use his utmost endeavour to remove from us our oppressor and th<sup>e</sup> oppressor of all his good Purposes a Person unknown to him and recommend to my Good Lord by Persons on whom he relied and those whom we are sure were not acquainted with his bad Hearth and mischiévous Intentions One of whom is General Hopson who has had sufficient Reason to alter his Opinion, the other is Gen<sup>l</sup> Cornwallis who is too much a friend to this People if he could

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<sup>1</sup> *British Museum*. — Brown MSS. — Papers relating to Nova Scotia, 1748-1757. — Add. MSS. vol. 19072. In-4o, fol. 43. No 33.

En tête de ce manuscrit se trouve la note suivante de M. A.-B. Grosart :

"A long letter (sixteen closely written pages) addressed to some one in England by the Colonists concerning the State of the Province ...

"This is a high-toned and most vigorous Letter : and lays bare with most withering scorn the character of Governor Lawrence... It reminds one of the complaints of the elder Puritans in the days of Charles ...

"This M.S. most important.

"See N<sup>o</sup> 35. From this I apprehend the present N<sup>o</sup> 33 was addressed to Paris while in England."



be convinced of the Ill-treatment and unjust oppressions this Tyrant has been Guilty of ever to Countenance or Support him.

These are all the Friends he has at home, for on this Side the Water he has none either of the Inhabitants or Gent<sup>n</sup> of the Army — who hold him in the utmost Contempt except those formerly mentioned to you his Agents in oppression — perhaps you will be more Suprizd to hear how this Gentleman who sometime ago was only a Painters Apprentice in London should have advanced himself to such heights — We are obliged to confess that he has a good address, a great deal of low cunning, is a most consummate flatterer, has Words full of the Warmest Expressions of an Upright Intention to perform much Good tho' never Intended and with much art most Solicitously Courts all Strangers whom he thinks can be of any Service to him, by these and such Arts has he risen to be what he is and Elated with his success is outrageously bent upon the destruction of every One that does not concur in his measures.

And we beg leave to make this Remark which we desire you will read at the end of Twelve Months that if he be not removed *Nova Scotia will be lost to the Crown of Great Britain and the rest of the Colonies be Endanger'd of sharing the same Fate* which ought to be the utmost concern of every Englishman to prevent.

And that you may in some measure understand the Import of this, he has prevaild with my Lord Loudon to represent home, the necessity of put<sup>g</sup> this Colony under a Military Government, and of suspend<sup>g</sup> the Charters and Laws of the other Colonies, the consequence of which we apprehend, will be a Struggle in the Colonies for Liberty, and a consequence too fatal to name; and while the Contentions subsist there, the French will penetrate into this Province: indeed they have no feazible Conquest left them but this Colony at present & if this Colony be lost and the others loose their Liberties it is difficult to say what the Effect will be, but the worst is to be feard.

We could say many things concerning the affairs in this Part of the World, which nearly concern us, but we are confident you'll hear them from better hands, for they must needs be public.

We cannot but express our most sincere acknowledgements of Gratitude and Thanks to the Right Hon<sup>ble</sup> Mr Pitt, that great Patron of Liberty, for the Great Condescension he has shown, in taking notice of our affairs; and so far as is reasonable and just, we doubt not of his Concurrence and assistance to procure us Redress.

In answer to your remarks that the Quorum of Sixteen is too large for the proposed number of 22 for the whole Assembly it is so in our opinion, but it was the Resolve of Council.

Our Desire of having all Placemen excluded the Assembly was from Circunstances of the Colony under the present Governor. The Voters are almost all dependant, the Officers are wholly so, it would therefore be the Governors Assembly & not the Peoples, and Laws made according to his Pleasure and no grievance will be redressed — but if a Gov<sup>r</sup> be appointed who has the Interest of the Colony at Heart, and the welfare of the People, this would be an immaterial Point.

The reason why triennial Assemblies was proposed was intended only for the first Assembly in Order to settle the Colony under an English Assembly. Otherwise Foreigners being th<sup>e</sup> most numerous and the Time near approaching when they will be Naturalizd by a 7 years Residence the future Assemblies may be mostly foreigners, which will be Dangerous to this frontier Settlement.

As to the Article of Judges a Good Gov<sup>r</sup> will avail more for the Advancement of Justice, and then a Good Judge will be under no concern least he be displaced.

Another of the Governors Acts is to misrepresent & abuse all below him he has publicly calld his Council a Pack of Scoundrills, the Merchants a Parcel of Vilians and Bankrupts, and has represented at home the whole as a People discontented and Rebellious We have authority of his saying & declaring this from his own mouth before many Officers both of the Army and Navy — Is it possible S<sup>r</sup> that People can be easy under such a Gov<sup>r</sup> We dare appeal to our two former Governors for our behaviour under their Administrations and whose conduct to us was the very reverse of this Gentlemans.

Believe us Sir We are not Captious. We are not that *Turbulent People* we have been represented our Interest obliges us to be otherwise we desire nothing *inconsistent with the Prerogatives of the Crown* we desire none other than the Liberties Enjoyed by the other Colonies which his Majesty has graciously been pleased to promise by his Royal Proclamation.

Our distresses have arisen from the Malevolent disposition of our Gov<sup>r</sup> & his Creatures. Were they removed and a Gov<sup>r</sup> of humanity appointed and acquainted with the Constitution of English Men and an Assembly settled you would soon have the Pleasure of hearing of the increase of and success of this settlement for we are well assured 500 families would remove from the Massachusetts and settle immediately here and we know the Offer has been made to Gov<sup>r</sup> and rejected upon their requiring an Assembly to be first settled that they might have proper Laws for their Regulation & Security of their Property.

As for the Evidences of Peoples leaving the Colony for want of an Assembly those that are already gone, it will take time to collect them as they are dispersed in the Colonies and tho' an hundred Families more are upon the Point of removing they are Extreme fearfull least if they should be found out to have Given such Evidence they should be denied passes, for you must know the Gov<sup>r</sup> obliges every master of a vessel to enter into Bond under the Penalty of fifty pounds forfeiture for every Person they carry away without Licence first obtained under his Hand and this is imposed, without the least Shadow of Law or Order in Council, nor can any Inhabitant go three miles from Town without a Certificate from a Justice of Peace so that Halifax is really a Prison to all Intents & purposes.

As for what you mention of the Depositions not coming under the Seal of the Province We beg leave to inform you That it has never been allow'd to be fix'd to any Papers but their own instead whereof the Gov<sup>r</sup> fixes his Private Seal and must see all the Evidences or his Secretary therefore to Such kind of Evidence it would be impossible to procure that and for want of the Province Seal many have suffered in their Law Suits in the neighbouring Colonies or obliged to be at the Expence of sending Witnesses where their Suits have been depending which are some among the many Rights we are debar'd of.

But we hope before this Time many Complaints have reached the Ear of the minister and that it will shortly evidently appear if it is not already manifest That whilst this Gov<sup>r</sup> has the least influence in American Affairs *so long will ruin and confusion attend them* and this Truth General Shirley at Home & Lord Charles Hay when he comes Home will as We are inform'd make Evident to Demonstration for it is generally believed that what ever Specious Crime may be alleged against Lord Charles Hay his Confinement was solely owing to the Governors insinuations to my Lord L. . d. . n upon a private disgust to that Lord for Examining too freely into the Expences of Batteries &c and speaking to Contemptibly of what had been done for the mighty sums Expended in Nova Scotia.

We had not touch'd upon those matters but as we think Providence more immediately seems to concern itself in discovering the Villianous Arts of the Authors of our Calamities and hope will direct its measures in pouring Vengeance on the man whose sole aim seems to have been to blast the good Intentions of his Country and to make all Subordinate to him miserable.

It is with pleasure we hear that the Acct<sup>s</sup> of Nova Scotia will be strictly enquired into as we are very sure if they were sifted to the Bottom it will be found That not less than ten thousand Pounds, of Rum, Molasses (of which there was not less than 30,000 Gallons which alone was worth £3,000) Beef Pork &c of Provisions and much merchandize for the Supply of the Indians & french Inhab<sup>ts</sup> were taken in Beau Sejour neither distributed as a Reward to the Captors nor accounted for except some small Quantity of Beef & Pork sold to the Commissary M<sup>r</sup> Saul on M<sup>r</sup> Bakers Supply which was extreme bad & decay'd and certify'd by the Gov<sup>r</sup> for Provisions sent by Gov<sup>r</sup> Shirley.

That the Transports were kept near three months after the French Neutrals were ready for Embarkation at an immense Expence and the New Engl<sup>d</sup> Troops kept 6 months after the service was

over for two special Reasons to oblige them to enlist into the Regulars and to defeat General Shirley in raising a sufficient number of Troops necessary for the Summers Campaign by which means Oswego was lost and the Expedition to Crown Point was rendered abortive We appeal to Gen<sup>l</sup> Shirley for the Truth of this.

That the Cattle &c of the french Inhabitants were converted to private uses of which we know 3,600 Hogs & near 1,000 Head of Cattle was kild & packt at Pisgate only & sent by water to other Places & what at other Forts is yet a secret All unaccounted for to the Amount of a very large sum & he & his Commissary are now under Great perplexity & contriving to cover this iniquitous Fraud.

That £30,000 has been laid out on Batteries not worth 30 pence for the Defence of this Place in the Judgment of every Person acquainted therewith.

It is possible he may produce Vouchers to Cover all his Frauds for if the true ones should fall short he has those under him who have been used to such kind of work & can readily supply the deficiency but if a Governor was sent out with Orders to inquire into these or at least to take Depositions we are very sure the whole will be Clearly made to appear.

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XXIV

EXTRACTS FROM A DESPATCH TO JUDGE BELCHER ON HIS APPOINTMENT TO THE PRESIDENCY OF THE COUNCIL OF NOVA SCOTIA DATED WHITEHALL MARCH 3<sup>d</sup> 1761.<sup>1</sup>

(Signed) DUNK. HALIFAX  
W. G. HAMILTON  
W. SLOPER

"It has been represented to Us that Gov<sup>r</sup> Lawrence had encouraged & protected the disorderly part of the military under his Gov<sup>t</sup>, in several outrages on the property, persons, and even the lives of the inhabitants; Sometimes by assuming illegal powers; and at others by abusing those which were lawfully vested in him for better purposes; by frequently interrupting the free course of Justice, in discharging while under prosecution, and in enlarging after conviction, soldiers and officers guilty of destroying fences, violent assaults, & many other far greater enormities."...

"Several very heavy Charges have likewise been made against Gov<sup>r</sup> Lawrence with respect to the Contracts which were entred into both on account of the Provisions distributed to the Weak Settlements of the Colony, and the Vessels which have so long been kept upon the establishment, for the service of the Province."

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XXV

EXTRACT FROM DR BROWN'S MS. RELATING TO LAWRENCE'S ABUSES.<sup>2</sup>

"With New England malice — this exclam<sup>n</sup> follows.

"How wicked must those men be, who thus dec<sup>e</sup> their country & by that means expose his Majesty's Colony & subj<sup>s</sup> to the weakest efforts of Louisbourg or Canada. Such persons no doubt would be glad to see this important Colony annexed to the Crown of France that they might never be called to acc<sup>t</sup> for their Abuse of the trust reposed in them & their misapplication of the Nations money."

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<sup>1</sup> *British Museum*. — Add. MSS., vol. 19073, fol. 71.

<sup>2</sup> *British Museum*. — Papers of Dr. Andrew Brown designed for a History of Nova Scotia. — Add. MSS., vol. 19075, fol. 89.



V — *Sainte-Anne d'Auray et ses environs,**Par* LOUIS FRÉCHETTE.

( Lu le 25 mai 1888. )

## I

## EN ROUTE

La saison des pèlerinages à Sainte-Anne de Beaupré est ouverte ; et, cette année comme les années passées, la petite, mais très ancienne paroisse canadienne va voir accourir des milliers et des milliers de fervents, poussés par leur dévotion à la patronne des vieux Bretons.

Ces touchantes réunions, ces rendez-vous pieux, sont plus que traditionnels chez nous : ils ont leur origine au berceau même de notre race. Sainte-Anne de Beaupré est — tout le monde le sait — fille de Sainte-Anne d'Auray. Notre humble sanctuaire, où se sont accomplis tant de faits miraculeux, où de si étonnantes guérisons s'opèrent, chaque saison, sous les yeux d'une foule émerveillée, est en quelque sorte une succursale de la basilique du Morbihan, où d'innombrables pèlerins viennent, de centaines de lieues à la ronde, attester si souvent et avec tant d'éclat la piété toujours renaissante de notre mère patrie.

Cette dévotion à sainte Anne — dévotion légendaire au Canada depuis les commencements de la colonie — me semble un argument de plus à l'appui de la conviction que je me suis faite en visitant ces différentes parties de la France : que, malgré l'opinion contraire entretenue par la plupart de nos historiens, nos ancêtres étaient plutôt originaires de Bretagne que de Normandie.

Notre clergé, nos religieuses étaient normands ; et la chose est assez naturelle, le pays ayant, pour les fins du culte, relevé de l'évêché de Rouen, jusqu'à l'érection du siège épiscopal de Québec. Nos familles nobles sont aussi, pour la grande partie, normandes ; leurs noms en général l'indiquent. C'est le contraire pour nos noms bourgeois et roturiers ; nulle part en Normandie on ne les rencontre aussi fréquemment que dans la Bretagne nantaise. Là, ils apparaissent sur toutes les enseignes, on les découvre dans tous les actes notariés. Quant à nos expressions populaires, elles y pullulent. On vous dira, par exemple : “ *Espérez*, je m'en va aller *qu'ri* les *sieaux* pour *tirer* les vaches. J'y ai retrouvé la *câlène*, le *ber*, les *bourriers*, les *mollières*. J'y ai vu des gens qui avaient *de quoi* à ne savoir *éoù* le mettre. Le paysan breton ignore le verbe *pleuvoir* ; il dit comme nos campagnards : il *mouille*. Chez lui, une nature renfrognée est un *caractère seul* ; — *comme ceci* se transforme en *de même*. Et, chose qui m'a surpris plus que tout le reste, *de même et de même*, locution que je croyais d'origine bien canadienne pourtant, est bretonne comme les marins de Jacques Cartier. Ainsi, les mêmes noms, le même langage, les mêmes légendes, les mêmes

coutumes, une parenté frappante dans les physionomies, le même patron populaire : saint Jean ; la même dévotion traditionnelle à la " bonne sainte Anne ; " je n'en ai pas demandé plus pour me fixer ; je me crois breton, bien breton, très breton. Et, avec l'entêtement du Breton, je n'en démordrai qu'à bon escient.

Mais laissons là cette question de nos origines, qui ne vient ici qu'incidemment. Je voulais vous parler, lecteurs, de Sainte-Anne d'Auray, de sa basilique, de ses traditions, et des intéressantes localités qui l'entourent. Nous ferons mieux : voici le 25 juillet, veille du grand *Pardon* ; un triduum extraordinaire se prépare sous les auspices de l'archevêque de Paris ; nous sommes à Nantes ; prenons le chemin de fer, et en route pour la vraie Bretagne bretonnante ! Vous allez voir quel charmant voyage nous allons faire, vous par l'imagination, moi par le souvenir.

Tandis que le train file vers la campagne, penchez-vous à la portière. Quels sont, dites-vous, ces vastes bâtiments alignés le long des quais, et dont l'architecture lourde et massive rappelle vaguement le profil du marché Champlain de Québec ? Ce sont les prisons. Ne vous vient-il pas à l'esprit cette vieille ballade de nos pères :

Dans les prisons de Nantes  
Luy a-t-un prisonnier,  
Gai faluron falurette !  
Luy a-t-un prisonnier,  
Gai faluron dondé ?

Oui, mais après ce naïf refrain du temps jadis, c'est une pensée plus sombre qui étreint le cœur. Là, derrière ces murs mornes et froids, se sont déroulées les scènes peut-être les plus poignantes de la Révolution française ; et le nom de l'infâme Carrier vous vient involontairement aux lèvres. Les condamnations aveugles, les exécutions, les massacres, les noyades, ce que le monstre nommait les *mariages républicains*, enfin mille cruautés inouïes, sans compter la sauvagerie des représailles, toutes ces pages sanglantes de l'histoire viennent flotter devant vos yeux avec des miroitements sinistres ; et vous ne pouvez regarder sans un froid dans le dos les flots calmes du fleuve où s'allaient engloutir, en pleine nuit, avec des milliers de victimes étouffées dans leurs flancs, ces infernales machines qu'on appelait les bateaux à soupape. Sur les hauteurs de la rive gauche, à une ou deux lieues d'ici, il y a le Château-d'Eau — un vaste et luxueux édifice — où s'est passé tant d'horreurs qu'on ne peut plus trouver personne pour l'habiter. Mais assez sur ce triste sujet.

Ici, saluons ! C'est la statue de " Sainte Anne bénissant la Loire," du haut d'un escarpement au flanc duquel s'étage un monumental escalier. Une apparition seulement, qui fuit derrière nous, avec le fouillis des mâts et la silhouette des clochers. Toute la ville s'éloigne aussi, et se fond peu à peu à l'horizon dans la fumée des usines et des bateaux à vapeur qui sillonnent le port.

Voici Indret, l'un des grands ateliers de l'Etat.

Presque en face, c'est la Basse-Indre, où fut construit le vaisseau *La Méduse*, dont le naufrage célèbre fournit à Géricault méconnu le sujet d'un immortel chef-d'œuvre.

Ce beau clocher, là-bas, c'est celui du Pellerin, — calme petit bourg où, voyageur attardé, j'ai passé deux mois et demi partagés entre les fatigues d'un labeur ardu et les charmes d'une hospitalité dont le souvenir me sera toujours cher. Si vous regardez bien,

du même côté, plus loin, vous apercevrez peut-être l'arête d'une grande tour isolée, émergeant par moments des hautes futaies, avec des nuées de corbeaux. C'est la tour de Buzay, — le dernier reste d'un monastère de génovéfains fameux dans la contrée. Ces paresseux de moines ont laissé là des travaux gigantesques. Ces fainéants ont creusé, entre le lac de Grand-Lieu et la Loire, à une époque où l'on ne parlait guère de ces choses pourtant, un canal qui fait encore l'admiration des ingénieurs.

Mais passons, — non sans jeter toutefois un coup d'œil vers ces collines lointaines qui s'estompent dans les reculements de la perspective. C'est le pays de Retz. Vous connaissez l'opérette de *Barbe-Bleue*, ou tout au moins vous vous souvenez du conte de Perreault qui porte ce titre. Eh bien, Barbe-Bleue n'est pas du tout ce qu'un vain peuple pense, un héros d'imagination. Il a bien et dûment existé en chair et en os. Il s'appelait de son vrai nom Gille de Retz, et portait les insignes de maréchal de France. Il fut exécuté à Nantes, le 26 octobre 1440, pour des horreurs innommables, auprès desquelles ce qu'on lui reproche dans les histoires de la veillée n'est que de la saint-jean. Ce pays de Retz constituait ses immenses domaines.

— Savenay ! crie une voix à la portière.

Des souvenirs plus modernes ici, sinon moins terribles. Cette petite ville a bien peu d'importance par elle-même, mais son nom tient une large place dans le récit des luttes fratricides qui ensanglantèrent la France, à la fin du siècle dernier. Ici, l'armée vendéenne, commandée par Fleuriot et Bernard de Marigny, fut écrasée par Marceau, Kléber et Westermann, le 15 novembre 1793. Les royalistes échappés aux désastres du Mans, n'ayant pu retraverser la Loire à Ancenis, avaient fait le tour de Nantes, et se trouvaient acculés dans le triangle formé par l'océan, la Loire et la Vilaine où il n'y avait plus ni bateaux ni ponts. Le carnage fut effroyable. Les Vendéens combattirent avec la fureur du désespoir ; mais ils furent presque anéantis. Il n'en échappa que douze à quinze cents, qui eurent la vie sauve en déposant leurs armes et en criant : *Vive la nation !* La journée fut décisive. Après cette défaite, les royalistes, tout en continuant la guerre de partisans, durent renoncer à tenir la campagne.

Mais je vous attarde en route. Un ou deux souvenirs encore, et je ne vous dis plus rien, que nous n'ayons aperçu, dans quelques heures, rayonner au soleil la belle statue — de sainte Anne toujours — qui surmonte la gare où nous devons descendre de wagon.

En attendant, voici Saint-Gildas-des-Bois. Vieille Abbaye pittoresquement encadrée, fondée, il y a plus de huit cent cinquante ans, par Simon de la Roche-Bernard. L'église qui en reste est classée parmi les monuments historiques de France ; c'est-à-dire qu'il est défendu aux vandales — il y en a partout — d'y porter la main.

Ce nom de Saint-Gildas me fait songer que, si nous descendions un peu du côté de la mer, nous trouverions Saint-Gildas-de-Rhuis, célèbre par son monastère, qui fut quelque temps gouverné par Abailard. Le fameux philosophe et théologien scolastique n'y fut guère heureux, si l'on en juge par l'extrait suivant d'une de ses lettres à Héloïse :

“ J'habite, disait-il, un pays barbare dont la langue m'est inconnue et en horreur (le celte) ; je n'ai de commerce qu'avec des peuples féroces ; mes promenades sont les bords inaccessibles d'une mer agitée ; mes moines n'ont d'autre règle que de n'en point avoir. Je voudrais que vous vissiez ma maison, vous ne la prendriez jamais pour une abbaye : les portes ne sont ornées que de pieds de biches, de loups, d'ours et de sangliers, des dépouilles hideuses des hiboux ; je crois à tout moment voir sur ma tête un glaive suspendu.”

L'église de Saint-Gildas-de-Rhuis, classée elle aussi parmi les monuments historiques, est très intéressante à visiter. On y voit en particulier le tombeau du saint.

Encore quelques lieues à toute vapeur, et nous arrivons à Vannes.

Vannes! — pas une belle ville dans le sens moderne du mot, non ; mais pour une vieille ville, oui ! Songeons-y, c'était la capitale des Venètes, plusieurs siècles avant l'ère chrétienne. Jules César en fit la conquête cinquante-sept ans avant Jésus-Christ. Si Vannes eût progressé comme Chicago, cette petite ville, dont la population ne s'élève pas à douze mille habitants, aurait enveloppé le globe. Très curieuse du reste. Avec ses maisons gothiques aux fenêtres maillées de plomb, ses étages en encorbellement, ses pignons aigus s'avancant les uns vers les autres comme pour se cogner le front au-dessus des ruelles étroites et sombres, ses façades croisillées, enchevêtrées, losangées de poutres et de poutrelles où courent les sculptures les plus bizarres, c'est le moyen âge qui revit là, comme sur une toile de décor.

Guère de respect pour les choses historiques cependant, messieurs les Vannois : le fameux château de LaMotte, qui fut longtemps la résidence des ducs de Bretagne, a été transformé en hôtel ; et les banquettes d'un théâtre ont envahi la salle où les Etats signèrent, en 1532, en présence de François Ier, l'acte d'union définitive et irrévocable entre la Bretagne et la France. Disons en revanche, et comme atténuation, que Vannes possède le plus beau musée d'antiquités celtiques qui soit au monde.

## II

### SAINTE-ANNE D'AURAY

Enfin, nous voici à Sainte-Anne.

Faufilons-nous à travers la cohue, et prenons place tant bien que mal dans les chars à bancs rangés là pour attendre les pèlerins, car nous avons encore un bon quart d'heure de route avant d'arriver au village.

Si vous n'êtes pas familiers avec la vie d'hôpital, ni chirurgiens amateurs de *beaux cas*, fermez les yeux, sinon vous allez voir le plus cauchemarisant défilé d'infirmes, de manchots, de goitreux, d'hydropiques et de culs-de-jatte, dont le plus fantasmagorique des poètes ait jamais rêvé la collection. La Cour des Miracles pour le moins est là, échelonnée sur la route, à droite et à gauche, qui vous guette et qui s'avance vers vous, boitant, se trainant, sautellant, pour exhiber qui sa plaie, qui ses moignons, qui sa gibbosité, afin de faire un plus éloquent appel à votre compassion. Cela navre, terrorise, donne des haut-le-cœur. Jetons des sous, et fuyons vite, mon Dieu !

Je me hâte d'ajouter que ces parasites de la dévotion ne sont pas des pèlerins, mais tout simplement des malheureux attirés là par l'espoir de trouver un plus nombreux concours de bonnes âmes à exploiter.

Tiens, quelque chose de doré brille là-haut dans le lointain. Qu'est-ce ? C'est le sommet de la basilique, la statue colossale de la patronne du pays, qui domine les environs du haut de son piédestal gigantesque. J'ignore si c'est l'effet produit sur mon esprit par cette armée de mendiants, et par les innombrables marchandes de cierges, de chapelets et de médailles qui m'assiègent à leur tour, mais, parole d'honneur, la statue elle-même a l'air de nous tendre la main comme pour demander quelque chose.



Ne plaisantons pas : la statue semble avoir réellement cette attitude. J'en fis un jour la remarque à M. LeGoff, l'artiste même qui l'a modelée. — C'est, me dit-il, une illusion d'optique produite par la dorure dont on l'a recouverte malgré moi. Cette dorure jette des reflets où il devrait y avoir des ombres ; et, à cette hauteur — près de cent mètres — il n'en faut pas plus pour fausser le coup d'œil.

Naturellement les hôtels sont encombrés. Mais comme nous avons télégraphié six jours à l'avance, on nous a retenu des lits au-dessus d'une épicerie du village. En manœuvrant avec sang-froid à travers les boucarts éventrés, les chaises boiteuses, les pelures et les tessons qui rendent encore plus scabreux le terrain gluant qui sert de parquet, et après avoir escaladé, sans accidents trop sérieux, une espèce de casse-cou affectant avec prétention des allures d'escalier, nous y arriverons bien sûr. Et, si nous avons la précaution de nous boucher aussi hermétiquement que possible les fosses nasales avec un coton protecteur, nous pourrons peut-être avoir l'illusion d'un sommeil bien gagné, entre une vingtaine de bottes d'oignons rocamboles, et cinq ou six caisses de savon rance et de chandelles de suif. Heureusement qu'il n'y a point de punaises ; et, tout bien considéré, il vaut encore mieux accepter cette perspective, que de nous résoudre à coucher à la belle étoile, ou à passer la nuit avec les pèlerins entassés dans l'église.

L'église, voilà ce qu'il faut visiter d'abord ; et tout de suite.

Ce splendide monument est de construction moderne : la première pierre en fut posée par l'abbé Fouchard, vicaire capitulaire, le 7 janvier 1866. Elle est toute en granit, et de style Renaissance, tel qu'on le traitait sous Louis XIII. L'architecte Duperthes a su imprimer à son œuvre un cachet spécial, en mariant, dans la structure générale de l'édifice, aux détails du style adopté, les proportions imposantes du gothique. De plus, par une fantaisie d'éclectisme hardi, le roman apparaît çà et là, à l'entrée principale surtout, et donne à l'ensemble un caractère d'originalité qui en rehausse encore l'harmonieux aspect. C'est grandiose, correct, savant et superbe. Mais pourquoi ce style Renaissance ? Pour moi il n'y a de véritable art chrétien que le gothique. Tout le reste est plus ou moins païen ou mondain.

L'église a la forme d'une croix latine : L'intérieur se divise en trois nefs auxquelles, à partir du transept, viennent s'en ajouter deux autres, — si l'on peut désigner ainsi la suite de chapelles absidiales qui contourne le chœur. Celui-ci est un chef-d'œuvre de goût et de richesse. On n'y voit que cuivre poli et marbres précieux. Le parquet est en fine mosaïque. Encastré dans la clôture, un petit monument rappelle l'endroit précis où fut découverte la fameuse statue dont je parlerai dans un instant.

Le maître-autel est monumental. Le dais, le retable, le tombeau, les degrés, tout est découpé dans d'admirables blocs de marbre blanc qui proviennent des fouilles faites dans l'Emporium, où les empereurs romains enfouissaient les marbres tirés des carrières lointaines. Comme l'indique une inscription, ils furent transportés à Rome sous Titus et Domitien. C'est un don royal de Pie IX. Cet autel est orné de quatre statues — les quatre évangélistes — dues au ciseau du célèbre sculpteur Falguière. A l'un des pieds-droits qui supportent la grande archivolt du chœur, est accolé un saint Joachim du même artiste, — à mon avis, une des belles œuvres de la statuaire du jour.

La chapelle particulière de sainte Anne, remplie d'un nombre incalculable d'ex-voto, — il y en a du reste dans toute l'église, — est à elle seule une merveille. Là repose, dans une niche élégante, surmontée d'un petit dôme richement ciselé, la statue miraculeuse.

Cette statue date de 1823. Son socle contient sous verre le seul fragment de l'effigie primitive — le côté gauche de la face — qui ait échappé à la rage des septembriseurs.

Racontons ici en peu de mots l'histoire de cette statue.

Le petit bourg de Sainte-Anne d'Auray — autrefois Keranna, *village d'Anne* — fut, dit-on, le premier endroit de l'Occident devenu chrétien où se soit élevé un sanctuaire consacré à l'aïeule du Sauveur. La première chapelle y fut construite vers l'an 640, d'après la tradition, par saint Mériadec, évêque de Vannes. Avant la fin du siècle, la chapelle fut détruite par les hordes dévastatrices qui parcouraient alors la Bretagne. L'image de la sainte resta enfouie sous les décombres, et avec les âges toute trace de l'ancienne construction disparut. Il ne resta plus là qu'un champ nommé le Bocenno. Cependant, rapporte la légende, on ne put jamais labourer sur une partie de ce champ. L'herbe y croissait, mais, chaque fois qu'on avait tenté d'y faire passer la charrue, les bœufs avaient reculé effrayés et comme repoussés par quelque puissance invisible.

Ce miracle, ou cette croyance populaire, contribua largement à perpétuer chez le peuple de l'endroit la dévotion à sainte Anne. Cette dévotion s'accrut, se répandit au loin ; et plus tard, dans toutes les parties de l'Armorique, la sainte devint l'objet d'un culte national. Les vieilles épopées bretonnes, exhumées par le savant archéologue M. de la Villemarqué, en font foi, de même que la plupart des anciennes chroniques. Ce sentiment semble n'avoir fait que grandir durant la période des 900 ans qui se sont écoulés entre la destruction de la première chapelle et les événements extraordinaires qui firent renaître celle-ci beaucoup plus grande et beaucoup plus belle.

En 1623, — je ne garantis rien, je raconte les faits comme je les ai recueillis sur les lieux et dans les ouvrages qui traitent du sujet, — un paysan de Keranna nommé Yves Nicolazic, qui s'était toujours fait remarquer par une grande piété envers la patronne du pays, fut témoin de phénomènes singuliers et l'objet d'étranges manifestations. La nuit, il était troublé dans son sommeil par une grande clarté, et, en s'éveillant, il apercevait un flambeau tenu par une main mystérieuse. Souvent aussi, quand il rentrait tard, il voyait la même lumière cheminant à ses côtés. Un soir, un de ses beaux-frères et lui ramenaient leurs bestiaux du pâturage, lorsque, dans le champ du Bocenno, à l'endroit même où l'eau d'une fontaine monumentale s'épanche aujourd'hui, à quelque distance de l'église, dans trois vastes bassins de granit, ils entrevirent une grande dame blanche flottant au milieu d'une irradiation éblouissante. La vision continua à visiter Nicolazic partout, près de la source, dans sa maison, dans sa grange. D'autres fois, c'étaient de vagues lueurs que Nicolazic apercevait du côté de l'emplacement du vieux sanctuaire, d'où lui arrivaient aussi parfois comme les échos perdus d'une musique ravissante. Le brave paysan, bouleversé par ces prodiges, et ne sachant que faire, se contentait de prier avec ferveur. Sa prière fut exaucée. Un jour, l'apparition se présenta de nouveau et lui adressa ces paroles dans le langage du pays :

— *Yves Nicolazic, ne craignez point ; je suis Anne, mère de Marie. Dites à votre recteur que, dans la pièce de terre appelée le Bocenno, il y a eu autrefois, même avant qu'il y eût aucun village, une chapelle dédiée en mon nom. C'était la première de tout le pays ; il y a 924 ans et 6 mois qu'elle a été ruinée. Je désire qu'elle soit rebâtie au plus tôt. Dieu veut que j'y sois honorée.*

Revenu à lui, Nicolazic s'adressa à son recteur, qui le traita d'illuminé, et le renvoya rudement à sa charrue. Alors les prodiges se succèdent. D'autres personnes en sont témoins. La contrée s'émue. On insiste auprès du recteur, qui se montre de plus en

plus incrédule. Les apparitions se renouvellent plus pressantes, et, un beau matin, Guillemette Leroux, femme de Nicolazic, trouve, suivant le texte des chroniques, “douze quarts d'écus disposés trois à trois ” sur une table où, quelques heures plus tôt, le flambeau de la sainte avait jeté sa lumière.<sup>1</sup>

On savait Nicolazic pauvre : il crut que l'exhibition de cet argent ferait croire à sa sincérité ; il se trompait. Nouveaux obstacles. Bref, sainte Anne lui apparaît une dernière fois, et lui dit d'aller éveiller ses voisins. Nicolazic se lève ; le flambeau marche devant lui. Les paysans, tirés de leur sommeil, suivent la lueur miraculeuse. Celle-ci les conduit vers le Bocenno, s'arrête sur un coin du champ, monte et descend par trois fois, et disparaît. C'était à l'endroit même où le soc n'avait jamais pu entamer le sol. On creuse, et l'on découvre la statue : une naïve figure en bois, de trois pieds de haut, noircie et rongée par l'humidité de la terre, mais conservant encore “ le bleu et l'azur dont l'avait ornée la main pieuse de l'artiste du septième siècle.”

Le recteur va-t-il se rendre cette fois ? Non ; il se montre plus récalcitrant que jamais. De l'argent, une statue, qu'est-ce que cela prouve ?

Enfin, il serait trop long d'entrer dans tous les détails ; après mainte rebuffade, maint interrogatoire, la bonne foi de Nicolazic fut reconnue, la chapelle élevée, et la statue antique — restaurée par un sculpteur d'Auray — fut installée dans le pieux sanctuaire. Et alors commença cette longue suite de miracles et d'interventions surnaturelles qui ont fait de Sainte-Anne d'Auray un lieu de pèlerinages célèbre entre tous. Comme je l'ai dit plus haut, la chapelle du “ bon Nicolazic ” fut remplacée, en 1866, par la basilique actuelle, l'une des plus remarquables de France, et dont les riches et flambantes verrières racontent phase par phase toute cette merveilleuse histoire.

Maintenant, si vous avez le jarret solide, et si vous n'êtes pas trop sujet au vertige, montez avec moi les marches de l'immense spirale qui conduit aux embrasures du campanile. Le temps est beau, l'atmosphère est limpide, le coup d'œil vous dédommagera de la misérable nuit que vous venez de passer.

De quelque côté qu'on se tourne, on aperçoit partout des tourelles ou des clochers, qui se font jour à travers les bouquets de verdure. Ici c'est un vieux château dont la poivrière reluit au soleil ; là c'est une arche grise jetée pittoresquement en travers de quelque ravin pierreux. Le regard découvre même, malgré la distance, le gigantesque phare de Lorient, dont la silhouette tranche sur le bleu foncé de la mer. Comptez les villages : voici Brech, Plumergat, Pluvigner. Là c'est Plumeret, où se trouve le tombeau de Mgr de Ségur. De ce côté, c'est l'antique ville d'Auray. Plus loin, c'est Carnac et Lochmariaker, avec leurs menhirs, leurs dolmens et leurs cromlechs. En face, au bout de ce ruban sinueux qu'on appelle la rivière d'Auray, c'est l'océan, — parages célèbres où les galères de Jules César remportèrent la victoire navale qui détourna, pour des siècles, le cours des destinées armoricaines.

Mais hâtons-nous de descendre, voici les cloches qui se mettent en branle. Les orgues vont bientôt tonner sous les grandes voûtes : allons nous mêler aux vingt-cinq à trente

<sup>1</sup> Ces pièces, dit le P. Hugues, étaient les unes du coin de Paris, de l'année 1623, les autres de 1625, et les autres de diverses fabriques. Cinq personnes, entre autres l'évêque de Vannes et le sénéchal d'Auray, purent en avoir une. Longtemps après, M<sup>me</sup> de Kervilia donna la sienne aux carmes, qui la conservèrent dans le trésor du couvent, enchassée dans un cristal. Les autres servirent à payer les ouvriers, quand on jeta les fondements de la chapelle.

mille pèlerins qui encombrant l'église, le cloître des carmes et toutes les avenues qui y conduisent.

Cette foule offre un aspect très original. Tous les points de la Bretagne y sont représentés, avec le costume particulier à chaque endroit. Ce costume est plus accusé chez les femmes que chez les hommes cependant. Le casaquin, le fichu bigarré et la coiffe en constituent les détails caractéristiques. La coiffe surtout. Oh ! celle-ci est de rigueur, et présente des variétés infinies. Il y en a de courtes, de longues, d'étroites, de larges, de pointues, de plates, de rondes, de carrées ; les unes se dressent en cônes verticaux, les autres s'allongent horizontalement derrière la nuque ; toutes ou presque toutes ont des ailes plus ou moins vastes, souvent artistement plissées, ruchées et tuyautées, affectant surtout les formes les plus diverses, et ornées quelquefois de dessins en broderie qui révèlent une très grande habileté d'aiguille. Cette forme n'est point matière de fantaisie : chaque petit pays a la sienne. Un Breton vous dira : "Voici ceux de Vannes, voici ceux de Quimper, voici ceux de Ploërmel, voici ceux de Pontivy, etc.," rien qu'à l'inspection des coiffes. Elles ne se ressemblent que par leur blancheur de neige. On dit que l'hermine se meurt d'une tache sur sa blanche fourrure ; je crois qu'une Bretonne aimerait mieux une blessure au cœur qu'une souillure à sa coiffe. La coiffe est sacrée.

Il y a aussi la *câline*. (Pourquoi ce mot ne se trouve-t-il pas dans les dictionnaires ?) La câline est portée par les vieilles. Elle est d'étoffe plus lourde et moins blanche ; elle se complique d'une bride noire, et sa forme est toujours la même : celle d'un bec de canard se prolongeant plus ou moins loin derrière la tête. Cette câline, un jupon ne dépassant pas la cheville, un petit fichu croisé sur une taille de six pouces de long, des sabots, un bâton, la bouche sévère et l'œil d'une acuité singulière, telle est la vieille Morbihanaise. Le type est invariable.

Chez les hommes, le costume national tend à s'effacer. Les jeunes portent encore le veston sans basques, avec broderies et garnitures de sequins, mais les vieux, les très vieux, ont seuls conservé les guêtres, les braies bouffantes, et les cheveux longs sous le chapeau à larges bords. Ce qui semble vouloir défier l'avenir, par exemple, ce sont les sabots. Cette chaussure, disparue chez nous depuis si longtemps, est encore d'un usage universel dans les campagnes de France. On entend partout son petit clic-clac au timbre harmonieux comme un pincement de harpe.

Toute cette foule si étrangement costumée est là, causant, chantant, riant, mangeant, priant à haute voix, assise en ronds, cheminant par groupes, avec ces mille rumeurs confuses qui rappellent le murmure des houles, le bruissement des forêts et le bourdonnement des ruches. Maintenant si j'ajoute que les Bretons semblent — comme tous les peuples primitifs du reste — avoir un goût très prononcé pour les couleurs voyantes, on aura une idée du curieux spectacle que nous avons sous les yeux. C'est comme une scène d'opéra.

Jouissons-en quelques instants, puis nous nous dirigerons du côté de la *Scala-sancta*. C'est une espèce de reposoir sur une estrade très élevée, auquel on arrive par deux larges escaliers, que les dévots gravissent à genoux. Cette construction, toute recouverte de draperies, et tout enguirlandée de drapeaux et de banderoles, se dresse à l'extrémité d'un vaste champ de forme oblongue, appelé le champ de l'Epine. C'est du haut de ce balcon que se fait le sermon du soir, et que la bénédiction du Saint-Sacrement se donne, à la clarté des cierges et des étoiles. A la nuit tombée, cent-trente-deux paroisses seront là, circulant en procession autour de cette enceinte immense, avant de se rendre à l'église.

C'est ce qu'on nomme en Bretagne "la retraite aux flambeaux." J'ai rarement vu de scène plus grandiose, et je n'en ai sûrement jamais vu de si entraînant. Cette foule énorme, avec ses innombrables points lumineux, qui s'avance lentement en plein champ, sous les arbres, dans les rues, en chantant des cantiques, et portant à la main un cierge dont la lumière est protégée par une espèce de petit cornet en papier multicolore, c'est non seulement féérique, c'est contagieux. On se laisse émouvoir ; on prend un cierge à son tour ; on suit la masse — où le paysan coudoie le grand seigneur — et, ma foi, avouons-le, on chante tant bien que mal avec les autres. Chants naïfs dont il suffit d'entendre une fois le refrain pour le répéter ensuite ; chants héroïques où se mêle toujours à la pensée intime le sentiment de la patrie, où percent à chaque phrase les préoccupations, les espoirs et les angoisses d'un peuple de marins et de soldats, constamment aux prises avec les éléments ou l'ennemi. Je crois pouvoir me rappeler un de ces refrains ; le voici :

Sainte patronne immaculée,  
Toi que nous implorons,  
Sur la vague ou dans la mêlée,  
Protège tes Bretons !

" Pour bien comprendre tout le charme de cette poésie naïve, dit l'abbé Nicol, il ne suffit pas de la lire, il faut l'entendre chanter." Mieux encore, ajouterai-je, il faut la chanter soi-même.

Loin de son pays, loin des siens, au sein d'une contrée encore plus étrange qu'étrangère, entouré de souvenirs héroïques et de légendes mystérieuses, en face de chefs-d'œuvre d'art contrastant avec toutes les rusticités d'une nature primitive, et mêlé par hasard ou autrement à ces imposantes démonstrations religieuses, on se sent dominé, charmé, gagné. Et de grosses larmes viennent vous rouler dans les yeux sans que vous sachiez trop pourquoi.

### III

#### CARNAC.

Quelqu'un nous avait dit : " Là-bas, sur ce sommet  
Au pied duquel, ruisseau que le druide aimait,  
Le Portefeuille roule en chantant sous les saules,  
S'élève un vieux dolmen, reste des vieilles Gaules."  
Quelques instants après, vers le plateau lointain  
Où gît ce survivant de tout un monde éteint,  
Enjambant les talus, sautant de roche en roche,  
Effarouchant l'oiseau qui fuit à notre approche,  
Nous nous hâtons tous deux, prêtant, chemin faisant,  
Notre oreille aux récits du petit paysan,  
Pieds nus et l'œil madré, qui nous montre la route,  
Et qui, d'un ton ravi, tout charmé qu'on l'écoute,  
Et promenant sur nous ses regards ébahis,  
Nous conte la légende étrange du pays :  
Cet étang, c'est la *Mare aux Martes* ; sur ces pierres,

Tous les soirs, à minuit, les pâles lavandières,  
 — Quiconque les dérange a de cuisants remords, —  
 Viennent battre et laver le blanc linceul des morts.  
 Des gens ont, disait-il, vu la *Pierre levée*  
*Des Rendes*, dans la nuit, descendre la cavée,  
 Allant à je ne sais quel affreux rendez vous ...  
 Lorsque l'enfant se tut, nous avions devant nous,  
 Enigme interrogée en vain par l'antiquaire,  
 Le dolmen — une masse énorme de calcaire —  
 Qui, sur quatre piliers informes suspendu,  
 S'élève hors du sol de ce coteau perdu,  
 Comme un autel dressé pour quelque dieu farouche.  
 Le colosse était là, verdi par une couche  
 De mousse et de lichens — témoin morne et discret  
 D'une époque dont nul ne connaît le secret.  
 O fatals monuments des âges druidiques,  
 Qui donc fera jaillir de vos blocs fatidiques  
 L'éclair mystérieux qui, depuis trois mille ans,  
 Invisible à tout œil, couve en vos rudes flancs ?

C'est en cheminant, le lendemain, sur la route de Carnac, que je répétais à mon compagnon de voyage ces vers inspirés par une visite que je fis, en 1880, au dolmen de Montborneau, près de Saint-Benoît-du-Saut, dans l'Indre. Car ces vestiges énigmatiques des anciens âges ont toujours eu pour moi un attrait singulier.

Qu'on me permette de modifier un peu la forme de ce récit, pour raconter le reste de mon voyage à travers un pays si plein de souvenirs historiques, à la recherche de ces monuments d'une civilisation sans histoire.

Nous avions pris une voiture de louage à Sainte-Anne ; et, entraînés par une rosse étiq̃ue, conduite par un Breton — que je ne qualifierai pas de têt̃u, de peur de commettre un pléoñasme — nous allions gaiement sur la grande route, par une journée charmante. Oh ! les routes de France, comme elles sont belles ! Vous connaissez celle qui conduit au parc de Montréal, lecteurs ; eh bien, elle est à peine comparable aux chemins publics qui sillonnent en tous sens les coins les moins fréquentés du territoire français. C'est aligné comme les plates-bandes d'un jardin anglais, uni comme une table de billard. Je m'étonne qu'on n'ait pas la fantaisie d'y voyager sur des patins à roulettes.

On sort du village par la route de Treulan. Celle-ci circule bientôt à travers les collines boisées et les rochers qui longent la rivière d'Auray, et, à mesure que nous avançons, le paysage devient de plus en plus pittoresque. Le cocher nous indique un escarpement sur lequel se campe une énorme masse de granit, disposée de telle façon que la main d'un enfant peut, dit-on, la mettre en mouvement. On l'appelle la *Pierre branlante*. Longtemps la croyance populaire a naturellement attribué de mystérieuses propriétés à ce bizarre phénomène d'équilibre. Mais nous avions trop grand'hâte d'arriver au but de notre voyage pour nous attarder à ces détails. Nous ne mîmes pied à terre qu'au *Champ des Martyrs*, théâtre d'un des plus sanglants souvenirs de la Révolution.

On connaît la malheureuse affaire de Quiberon. En 1795, les émigrés d'Allemagne et d'Angleterre firent une descente en Bretagne, protégés par l'escadre anglaise du com-

modore Warren. Ils y furent rejoints par les chouans de George Cadoudal. Le jeune et brillant général Hoche fut envoyé contre eux et les vainquit. C'est alors que commence la scène dramatique.

Les royalistes, sous le commandement de Sombreuil, poursuivis par les vainqueurs, font des efforts désespérés pour regagner les vaisseaux anglais qui les ont apportés ; mais la mer est mauvaise, et l'embarquement presque impossible. Les fuyards se noient par milliers, et ceux qui restent sont impitoyablement décimés par les balles républicaines. L'affolement est à son comble. Enfin, Sombreuil lui-même, avec ses derniers partisans, est acculé sur une falaise à pic, et, n'ayant aucun espoir de salut, met bas les armes.

Ils se rendirent, disent les royalistes, sous promesse d'avoir la vie sauve. Cette assertion est-elle exacte ? Y eut-il réellement capitulation ? Voilà le problème de l'histoire. Je ne veux pas essayer de le résoudre ; je me bornerai à citer les paroles de Thiers. Voici ce qu'il dit en propres termes :

“ Quelques grenadiers crièrent, dit-on, aux émigrés : — *Rendez-vous, on ne vous fera rien !* Ce mot courut de rang en rang. Sombreuil voulut s'approcher pour parlementer avec le général Humbert ; mais le feu empêchait de s'avancer. Aussitôt un officier émigré se jeta à la nage pour aller faire cesser le feu. Hoche ne pouvait offrir une capitulation ; il connaissait trop bien les lois contre les émigrés pour oser s'engager, et il était incapable de promettre ce qu'il ne pouvait pas tenir. Il a assuré, dans une lettre publiée dans toute l'Europe, qu'il n'entendit aucune des promesses attribuées au général Humbert, et qu'il ne les aurait pas souffertes. Il s'avança, et les émigrés, n'ayant plus d'autre ressource que de se rendre ou de se faire tuer, eurent l'espoir qu'on les traiterait peut-être comme les Vendéens. Ils mirent bas les armes. Aucune capitulation, même verbale, n'eut lieu avec Hoche.”

Ce témoignage me semble d'un grand poids.

Quoi qu'il en soit, les prisonniers, au nombre de 982, furent passés par les armes, et inhumés à cet endroit qu'on appelle le *Champ des Martyrs*. L'humanité est ainsi faite ; toutes les victimes des guerres civiles et des guerres de religion sont, aux yeux de leurs adversaires, des traîtres et des renégats ; aux yeux de leurs partisans, ce sont des martyrs.

Ce champ de mort consiste en une vaste avenue, très large et plantée de grands arbres, qui conduit à une chapelle à fronton toscan, portant ces deux inscriptions : *Hic ceciderunt*, et *In memoria æterna erunt justi*. L'intérieur de cette chapelle est nu, et n'a jamais été terminé. En 1814, les restes des malheureux furent transférés à la Grande-Chartreuse d'Auray, où, le 20 septembre 1829, la duchesse d'Angoulême, fille de Louis XVI, posa la première pierre du somptueux mausolée qui les recouvre aujourd'hui. Ce mausolée s'élève à l'intérieur d'une chapelle dont il est le seul ornement. C'est un immense cénotaphe en marbre blanc, d'un goût sévère mais exquis. La partie supérieure est ornée de bas-reliefs superbes, et des quatre bustes en demi-bosse de Sombreuil, de Talhouët, de d'Hervilly et de Solanges, les principaux chefs de l'expédition. Les côtés étroits sont couronnés par deux tympanes où l'artiste — David d'Angers — a représenté, d'un côté, la Religion déposant une couronne sur un tombeau, de l'autre, l'évêque de Dol, Mgr de Hercé, qui fut l'une des victimes de ce déplorable événement.

On entre dans l'intérieur du monument par une des extrémités du stylobate, et l'on se trouve en face d'une ouverture carrée ménagée dans le parquet. Une bonne religieuse y laisse descendre une lanterne attachée au bout d'une corde, et, penchés sur l'excavation



funèbre, nous apercevons, dans les profondeurs sombres, un amas d'ossements et de crânes terreux, au-dessus desquels la lanterne se balance lentement, en promenant çà et là des reflets macabres. Cela fait frissonner.

Dans les encadrements latéraux sont gravés les noms de ceux à la mémoire de qui le monument est consacré. J'ai eu la curiosité de les lire tous, et de noter ceux qu'on retrouve au Canada. Les voici :

Aubin, Aubry, Barré, Benoît, Beauvais, Beauregard, Beaumont, Beaufort, Bernard, Berthelot, Bibeau, Boucher, Bonneville, Caron, Brossard, Charbonneau, Chrétien, Cormier, Delorme, Delisle, David, Dano, Duval, Fontaine, Foucault, Fournier, Gauthier, Goyer, Grenier, Hébert, Jacques, Lainé, Lebeau, Leblanc, Leclerc, Lefebvre, Legris, Lévêque, Louis de Lusignan, Maréchal, Martin, Masson, LeMoine, Mignaux, Morrison, Noël, Pelletier, Perron, Perrault, Plessis, Poulain, Prévost, Prévile, Riou, Robert, Rouville, Séguin, Thibault, Proux et Villeneuve.

Ne croirait-on pas feuilleter le *Dictionnaire généalogique* de Mgr Tanguay ?

En sortant, j'aperçus, appendue à la muraille, une planchette noire, portant ces quelques mots en lettres blanches :

*Tombeau des royalistes, courageux défenseurs de l'autel  
et du trône. Ils tombèrent martyrs de leurs nobles efforts.  
Quel Français PÉNÉTRÉ DES DROITS DE LA COURONNE  
ignore ce qu'il doit à ces illustres morts ?*

Et je m'éloignai désagréablement impressionné : cette note politique criarde, où perce la mesquine réclame de partisan, me révélant ainsi à brûle-pourpoint tout ce qui peut se cacher de comédie intéressée au fond des choses les plus solennelles, avait produit sur moi l'effet d'une douche d'eau froide. Passons.

Un détail à observer. Chose curieuse, et qui pourra peut-être intriguer les membres des futures académies des Inscriptions et Belles-Lettres, le marbre du monument porte en relief le millésime 1745, au lieu de 1795. L'artiste a commis l'irréparable erreur d'oublier un L parmi les chiffres romains. Ainsi, dans les âges à venir, ces pauvres martyrs de la politique, et dont la politique exploite encore le souvenir, n'auront seulement pas droit à leur épitaphe. Il est évident qu'on n'aura jamais l'idée de leur assigner un tombeau portant une date de cinquante ans antérieure à celle de leur décès.

Remontons en voiture.

Le paysage s'est transformé. Plus de coteaux ombreux ni d'attrayantes perspectives : nous traversons une lande.

— Voyez-vous, nous dit notre cocher, cette croix de pierre, là-bas, au bord de cette route abandonnée ? C'est là qu'a péri un grand personnage, ajouta-t-il ; comme qui dirait un roi. Il y a très longtemps.

En effet, nous étions sur le champ de bataille d'Auray, où se termina, en 1364, la sanglante guerre dite de *Succession*, querelle princière qui, durant vingt-quatre ans, avait couvert la Bretagne de ruines et de cadavres. Charles de Blois disputait la possession du duché à son parent Jean de Montfort. Il ne s'agissait pourtant que de savoir à quelle sauce ces pauvres Bretons devaient être accommodés. Et ceux-ci s'entr'égorgeaient à qui mieux mieux, tout comme s'ils eussent été fort intéressés dans le résultat. Enfin, le 29 septembre, les deux partis rivaux se rencontrent à cet endroit même, déterminés à mettre



fin à cette longue guerre intestine, par un combat terrible mais décisif. Charles de Blois a pour lui les soldats du roi de France, sous les ordres du fameux Bertrand Duguesclin. Jean de Montfort, de son côté, s'appuie sur Olivier de Clisson et les troupes anglaises commandées par Jean Chandos. La victoire, disputée avec acharnement, se rangea sous les drapeaux anglais, après dix mortelles heures de lutte sans trêve ni merci. Charles de Blois fut tué, et Duguesclin dut rendre son épée, après avoir couché autour de lui des monceaux de morts. La fleur de la chevalerie française fut fauchée dans cette journée néfaste. Tout cela pour deux cousins qui se jalourent !

A peu près rien à dire de la petite ville d'Auray. On n'y remarque qu'une ancienne église du XIII<sup>e</sup> siècle, transformée en caserne. Elle a ceci de particulier qu'elle est de style arabe.

Aux environs de la ville, on m'indique, à distance, la maison de George Cadoudal, le vaillant mais obstiné conspirateur que Napoléon fit exécuter. C'est à ce vieux moulin, dont les ailes délabrées jettent encore leur ombre du haut de ce plateau témoin de plus d'une mêlée farouche, qu'il arborait ses signaux de ralliement.

Enfin on ne peut faire un pas dans ce pays, sans évoquer quelques-unes de ces scènes féroces, exploits de sauvagerie et d'héroïsme brutal, qu'on est convenu d'appeler de grands souvenirs.

Mais voici qui va faire une heureuse diversion. Quelle est cette maison à l'aspect austère ? La croix de pierre qui surmonte la fontaine du coin donne à l'établissement une apparence quasi monastique. Ah ! il y a une enseigne. Lisons :

#### AU MONT DU SALUT

##### *Débit de boisson.*

Singulière enseigne pour une buvette, n'est-ce pas ?

Eh bien, c'est ainsi en Bretagne. On n'y mêle pas la religion seulement à la politique ; on l'introduit même au cabaret. Le cabaret et la politique en deviennent-ils moins profanes ? Je n'en ferais pas serment. D'un autre côté, on a peut-être voulu jouer sur le mot *salut* ; ce n'est pas impossible. En tout cas, je ne me torturai pas la cervelle pour approfondir la question. Ce qui nous importait le plus dans le moment, c'était de savoir si l'édifiant pavillon couvrait une bonne marchandise. L'expérience fut favorable. Nous trouvâmes là un petit bleu, à deux sous le gobelet, que je recommande à ceux de mes lecteurs qui pourraient un jour se trouver, comme moi, altérés par la poussière des antiquités romaines et druidiques, soulevée par le vent de la mer, sur la route de Carnac.

Carnac, nous y arrivons.

Déjà nous apercevons dans le lointain le gigantesque tumulus ou galgal que les habitants du pays nomment le Mont Saint-Michel ; et tous ces points gris çà et là dispersés dans la campagne, ce sont les fameux menhirs.

Des petits garçons et des petites filles galopent pieds nus à côté de notre voiture, nous présentant des bouquets de bruyère, et s'offrant pour nous servir de guides. Nous laissons le cocher filer tout seul au village, tandis que nous nous acheminons à pied à travers la lande, à la suite de nos petits cicéroni.

On éprouve une impression de saisissement lorsqu'on arrive parmi ces masses granitiques dressées là, au milieu de ces champs incultes, sans que rien dans l'histoire des siècles nous ait encore révélé ni leur origine ni leur destination. Combien de mille ans ont-ils pesé sur ces géants silencieux ? Combien de générations d'hommes ont-elles disparu, enfouies les unes sous les autres, depuis que ces blocs rugueux dorment là dans leur attitude éternellement morne ! Quels orages dans le ciel, et quelles révolutions sur la terre, ces monuments d'un autre âge ont-ils vu passer, dans leur immobilité morose ! Hélas ! comme la vie nous semble courte et peu de chose, en présence de ces témoins d'époques et de races à jamais oubliées !

Ces monuments, que la plupart des antiquaires rattachent à l'ère druidique, sont de deux sortes : les menhirs et les dolmens. Les menhirs sont de simples monolithes bruts, de forme allongée, plantés verticalement, quelquefois enfoncés dans la terre, quelquefois simplement érigés sur le sol. Les menhirs sont les plus nombreux. Les dolmens se composent de grandes pierres plates posées horizontalement sur d'autres pierres fichées en terre. On suppose que c'étaient là les autels dont les prêtres de Teutatès se servaient pour leurs sacrifices humains. Quand les menhirs sont rangés en cercle ou en demi-cercle, leur agglomération prend le nom de cromlech.

Ces menhirs, qu'on nomme aussi peulvans, sont de différente grandeur. Plusieurs n'ont que quelques pieds hors de terre, tandis que d'autres pourraient rivaliser avec les obélisques égyptiens. Ainsi, dans la commune de Plouharzel, on en voit un de quarante pieds de haut. Dans la Charente-Inférieure, dit Onésime Reclus, il y en avait un de soixante-quinze pieds, qu'on a scié pour en tirer de la pierre à bâtir. A Lockmariaker, à deux pas de Carnac, se trouvent encore les quatre fragments gisants d'un monolithe qui devait s'élever à soixante-dix pieds — un peu plus haut que celui de la place de la Concorde. On prétend que le géant a été abattu et brisé par la foudre.

Mais ces proportions sont exceptionnelles. A l'endroit où nous nous plaçâmes pour avoir la meilleure vue d'ensemble possible, les plus hauts menhirs ne dépassaient pas double hauteur d'homme.

Ces pierres sont rangées par alignements au nombre de onze, formant dix avenues, à peine interrompues par-ci par-là, sur une distance de plus de deux lieues. On en compte encore dix-neuf cents, reste de douze à quinze mille, assure-t-on.

Qu'est-ce que c'est que ces pierres ? Des tombeaux ? Des emblèmes destinés à commémorer d'importants événements, à rappeler certains noms illustres ? Formeraient-elles des temples, des panthéons, où chaque menhir représenterait un dieu ou un grand homme ? Toutes ces hypothèses ont été savamment discutées par les archéologues, sans apporter de lumière réelle sur le sujet ; et les théories les plus savantes ne me paraissent pas avoir beaucoup plus de valeur que l'explication donnée par mon petit cicerone :

— C'est, dit-il, des soldats romains punis pour avoir fait la guerre au pape saint Corneille. Celui-ci, poursuivi par les légions, et se voyant arrêté et cerné par la mer, qui s'ouvrait devant lui, se retourna, étendit la main, et changea les guerriers païens en pierre. Les petits, là-bas, ajoutait-il, c'étaient les soldats ; ces gros-ci, c'étaient les généraux !

Puis le petit bonhomme me montrait, dans le flanc d'un des géants de pierre, une niche autrefois habitée par une statue du saint. Cette niche devait avoir la forme même de l'image, car le rusé loustic m'indiqua la place du bras étendu pour pétrifier les mécréants. Il voyait cela parfaitement, lui. J'aurais voulu avoir le même privilège.

A propos, les légendes les plus extraordinaires ont longtemps circulé, et circulent même encore, dans certaines parties de la France, au sujet de ces pierres celtiques, qu'on nomme, suivant les localités, pierres droites, pierres levées, pierres fiches, pierres fichades, pierres frites, pierres lattes, palets de Gargantua, quenouilles du diable, etc.

Il ne faut pas les regarder de travers : elles vous reconnaissent fort bien, et savent vous faire repentir de votre irrévérence. Elles se promènent la nuit, se cherchent, se réunissent pour se livrer à l'on ne sait quels monstrueux sabbats. Malheur à qui se trouve sur leur passage !

J'interrogeai là-dessus le petit Breton ; il m'assura naïvement que celles de Carnac ne bougeaient jamais. Les légendes s'en vont — comme les dieux. Le mystère même de la *Pierre sonnante* n'en fut pas un longtemps pour moi. Cette pierre sonnante est un gros menhir rond ; quand on le frappe avec un caillou, il résonne comme une cloche. Intrigué, j'en fis le tour ; et j'aperçus, dans le flanc du colosse, une fissure qui s'ouvrait et courait autour de la pierre, en formant comme une espèce d'écorce séparée du bloc par un vide qui la rendait sonore. C'était là tout le miracle.

Il me resterait bien des choses à dire de ces étranges monuments. Je pourrais parler aussi des importantes découvertes d'antiquités romaines — nombreuses dans cette région — que la science doit aux fouilles exécutées dans ces derniers temps par le fameux géologue anglais Miln, dont nous visitâmes aussi le très curieux musée. Mais ces détails dépasseraient les bornes que j'ai fixées à mon travail.

Je clorai donc ces notes de voyage — jetées sur le papier, comme on pourrait dire, à bâton rompu — en ajoutant que, une heure après avoir pris congé de mes vieux amis, les menhirs et les dolmens, nous étions assis, mon compagnon et moi, à la table d'une hôtellerie du village, en train de juger les huîtres de Carnac, célèbres dans la contrée.

Mes amis, quand vous aurez devant vous une assiettée de nos savoureuses malpecks ou de nos succulentes bouctouches, bénissez le ciel ; elles sont incomparables au monde.

Les huîtres de Carnac furent le seul désappointement de mon voyage. Je souhaite à ceux de mes lecteurs qui visiteront Sainte-Anne d'Auray et ses environs de n'en pas éprouver d'autres.



VI — *Le général sir Frederick Haldimand à Québec, 1778-84,*

Par J.-M. LEMOINE.

( Lu le 23 mai 1888. )

## I

Le 3 août 1881, pendant une trop courte vacance au-delà des mers, j'entrais, muni d'un billet d'admission, dans le vestibule d'un grand édifice situé Great Russell street, à Londres.

Après avoir fait étape dans plusieurs vastes salles bondées de livres, de sculptures antiques, de curiosités du temps de Chéops et de Sésostris, je pénétrai sous le dôme d'une pièce immense et circulaire — la nouvelle salle de lecture du Musée Britannique, ouverte en 1857. L'édifice primitif, Montague House<sup>1</sup>, a subi bien des transformations depuis 1753 où le parlement de la Grande-Bretagne commençait à y réunir ses trésors littéraires et artistiques, toute une série de bibliothèques et d'antiquités.

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<sup>1</sup> Le gouvernement anglais avait acquis *Montague House* pour y installer la riche bibliothèque de sir Hans Sloane, achetée après sa mort, en 1753, par l'Etat, et valant près de \$260,000, ainsi que les manuscrits sans prix de la collection Harleienne, et ceux de la bibliothèque Cotton.

Le roi George III l'enrichit d'un choix d'antiquités égyptiennes, en 1801 ; et l'achat des marbres Townley, en 1805, et en 1816 des marbres Elgin, reste des admirables sculptures exécutées par Phidias pour le Parthénon d'Athènes, acquis au prix de \$300,000 par l'ambassadeur anglais à Constantinople, nécessita l'érection d'une aile additionnelle à l'édifice. Puis vint l'installation de la bibliothèque du roi George III, présentée au peuple anglais, en 1823, par son successeur George IV.

L'on ne tarda pas à se convaincre que *Montague House*, si vaste qu'il fût, était insuffisant pour loger tant de merveilles.

L'Etat chargea sir Richard Smirke de préparer les plans et de jeter les bases d'un autre édifice bien plus spacieux ; et cette nouvelle construction, le *British Museum* actuel, commencée vers 1823, ne fut complétée par Sydney Smirke, le plus jeune frère de sir Richard, qu'en 1852.

La façade principale, sur *Great Russell street*, est de 370 pieds de longueur, avec des ailes d'une grande étendue. Quarante colonnes ioniques en ornent le fronton. Sous le péristyle, on remarque la statue de Shakespeare, sculptée par Roubiliac et donnée par le tragédien Garrick, celle de sir Joseph Banks, par Chantrey, et d'autres sculptures par Westmacott et Nollekens, etc.

La nouvelle chambre de lecture, imposante salle circulaire avec un dôme vitré à arêtes en fer, haut de 106 pieds sur 140 de diamètre, a coûté \$750,000.

Elle peut contenir trois cent soixante personnes à la fois aux pupitres de consultation. Le catalogue des livres, dont le nombre s'élève à plus d'un million, forme deux mille volumes disposés sur des tablettes, pour l'usage des personnes qui ont des recherches à faire dans cet arsenal de science artistique, littéraire et historique. Les trésors accumulés au Musée Britannique sont répartis dans une soixantaine de grandes pièces, et classés en huit départements surveillés chacun par un conservateur spécial.

Antiquités orientales, égyptiennes, étrusques, grecques, romaines, saxonnes, etc. ; médailles, monnaies, bronzes, marbres, gravures, impressions, autographes, manuscrits, livres, tout est étiqueté, systématiquement classé ; chaque spécialité a ses salles, chaque objet sa case.

On fixe le nombre des personnes admises au Musée Britannique, en 1879, à 782,823. Les livres continuent de s'y accumuler, en même temps qu'augmente la foule des visiteurs qui afflue de tous les coins du monde.

Ce qui frappa d'abord mes regards, ce fut l'estrade élevée au centre, d'où le surintendant peut surveiller les nombreux lecteurs et lectrices assis devant leur pupitre, absorbés dans la lecture, ou prenant des notes dans les gros volumes mis à leur disposition.

Au moment où je m'installais, une figure bien connue à Québec franchissait le seuil de la salle. C'était Francis Parkman, de Boston, le brillant biographe de Wolfe et de Montcalm ; preuve que ce jour là, parmi les occupants des trois cent soixante pupitres qui rayonnent tous vers un centre commun, il y avait plus d'un chercheur accouru des lointaines régions de l'Occident vers ce foyer de lumière, en quête de renseignements historiques.

Je sentis ma curiosité, ma convoitise littéraire, dirai-je, redoubler au spectacle de tant de richesses.

Cette volumineuse correspondance officielle de nos vice-rois après la conquête — livres clos au commun des mortels, depuis les premiers temps jusqu'à l'ère de la Confédération, en 1867 — m'était maintenant accessible. L'Etat avait enlevé les scellés, proclamant qu'une ère d'apaisement avait été inaugurée, que la métropole ne craignait plus de raviver de vieilles animosités, en produisant au grand jour le dossier de tant de mémorables litiges.

Je demandai à consulter la collection Haldimand. On me fit la remarque qu'elle se composait d'au delà de deux cents volumes, — qu'on mit à ma disposition, avec encre, plume et papier.

J'entends, aujourd'hui, dans cette étude :

1o — Signaler l'inappréciable avantage d'avoir maintenant à notre disposition, dans la capitale du pays, une masse de documents authentiques qui pourra servir à éclaircir un obscur passé, à refaire peu à peu bien des pages de cette époque si féconde en grands événements — 1755 à 1791, — c'est-à-dire la Collection Haldimand (*Haldimand Papers*) ;

2o — Etudier, pièces en mains, une notable figure de notre histoire — celle du général Haldimand — personnage spécialement associé, par sa haute position de gouverneur général, de 1778 à 1784, à nos destinées, durant une des périodes les plus palpitantes que la colonie ait traversées : — celle de la guerre de l'Indépendance américaine — dont le souffle un moment menaça de chasser le drapeau anglais du continent entier ; ce qui serait infailliblement arrivé, si nos milices ne se fussent ralliées sur nos bastions, quand l'envahisseur frappait aux portes du vieux Québec ;

3o — Esquisser au fil de la plume le groupe social auquel l'administration des affaires mêla parmi nous le général Haldimand, pendant ces années orageuses, où le sort de la colonie tremblait dans un des plateaux de la balance ;

4o — Examiner les griefs qu'on a formulés contre l'administration coloniale de cet homme d'Etat.

La correspondance officielle de Haldimand, soit comme gouverneur général, soit comme homme d'Etat, de 1755 à 1791, est comprise dans deux cent quarante trois robustes in-folio<sup>1</sup>. Cette immense agglomération de manuscrits transcrits au Musée Britannique, sous la surveillance de M. Douglas Brymner, durant plusieurs années, maintenant classés par ordre de dates avec index et sommaire de chaque pièce, est partie intégrante des

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<sup>1</sup> En 1888, M. Brymner compte dans les archives fédérales 232 volumes ; il ne reste que 11 volumes à transcrire à Londres.

archives du Canada, au ministère de l'Agriculture, à Ottawa. Le bureau des archives prend, au Canada, la place du *Public Record Office*, à Londres. Le public y a libre accès. C'est cette importante source de renseignements dont le contenu nous est révélé dans les volumineux rapports présentés annuellement au parlement par l'archiviste principal, M. Douglas Brymner, et son laborieux assistant, M. Joseph Marmette.

Les manuscrits connus au Musée Britannique sous le nom de *Haldimand Papers* y furent déposés en 1857, par M. George Haldimand, de Londres, le neveu et l'héritier du général. Ce dernier a laissé son nom à une importante circonscription électorale, dans l'ouest du Canada, ainsi qu'à une rue bien connue de Québec. Il compte plusieurs descendants collatéraux aux Etats-Unis, à Montréal et ailleurs ; mais le nom a subi un léger changement : il s'écrit Haldeman en certains endroits.

Cette colossale correspondance, qui embrasse un espace de trente cinq ans, se termine en 1791, l'année de la mort du général<sup>1</sup>. Marquée au coin de l'exactitude, de l'impartialité et d'une certaine élévation de sentiments, et couvrant la période 1755-91, elle est d'un grand intérêt.

Haldimand a, en effet, assisté à bien des événements d'une importance majeure, dans le nouveau monde.

Il a pris part, pendant la guerre de Sept Ans, aux campagnes de l'Ohio, si désastreuses pour les armées anglaises.

Il a pu suivre, à leurs pénibles traces, les pauvres Acadiens dispersés aux quatre vents, par l'ordre du colonel Lawrence et des autorités de la Nouvelle-Angleterre. Il a été appelé, comme administrateur de la colonie qui leur servait d'asile, à accueillir d'autres proscrits — les loyalistes anglais, expulsés des Etats-Unis, pour avoir, comme les Acadiens, été trop fidèles à leur allégeance première. Plus heureux que ceux de Grand-Pré, ils furent reçus à bras ouverts par leur souverain George III, qui leur prodigua des terres, des pensions, et confia à quelques-uns les charges les plus élevées dans les colonies.

Haldimand a dû voir comme la vieille France trahissait, délaissait, insultait, à Versailles<sup>2</sup> et à Ferney, la Nouvelle-France en 1759.

Son oreille a pu saisir les premiers grondements de la foudre révolutionnaire qui éclatait en Amérique à la suite de l'adoption en Angleterre de la loi des Timbres, en 1765, et plus tard, entendre ses fulminantes reverbérations à Bunker-Hill, Lexington, Saratoga, Yorktown, etc. Il a dû constater l'héroïque défense de Québec, en 1775, "assailli par les hordes indisciplinées mais hardies d'Arnold et de Montgomery," les menées sourdes, dans nos murs, des traîtres soudoyés par le Congrès, menées qu'il sut déjouer sans effusion de sang. Il a su prévoir, impuissant à la prévenir, la révolte provoquée par l'entêtement de George III, et en dépit des sages remontrances de l'illustre Chatham et de

<sup>1</sup> Le général Frederick Haldimand mourut en 1791, à Yuerdun, en Suisse, où il était né.

<sup>2</sup> Quand le pauvre soldat, avec son vieux drapeau,  
Essaya de franchir les portes de Versailles,  
Les lâches courtisans, à cet hôte nouveau  
Qui parlait de *nos gens*, de gloire, de batailles,  
D'enfants abandonnés, des nobles sentiments  
Que notre cœur bénit et que le ciel protège,  
Demandaient, en riant de ses tristes accents,  
Ce qu'importaient au roi *quelques arpents de neige*.

lord North. Il a été témoin de ce grand schisme de la vigoureuse nation anglo saxonne — scindée en deux par le traité de 1783 — mais devenue par la suite encore plus puissante, et comptant maintenant trois cent millions de sujets. Il a pu suivre, en Angleterre, la marche des événements qui, en 1791, nous donnaient nos institutions représentatives.

Tels sont quelques-uns des incidents de notre existence coloniale, dans lesquels Haldimand a eu sa part de sollicitude, de déception, de succès, de dangers, de gloire et de récompense.

Pour traverser l'ère critique de 1778-84, durant laquelle la suppression de la révolte anglo-saxonne causa tant d'insomnies au puissant monarque de la Grande-Bretagne, il fallait en Amérique, d'abord, une habile et vigoureuse direction militaire, et, comme auxiliaire au Canada — le point d'appui en ce moment fatidique — une administration ferme, peut-être même marquée au coin de la modération, à cause des Canadiens, nouveaux sujets dont l'allégeance n'était pas encore bien affermie. C'était moins un gouverneur populaire comme sir Guy Carleton que la Couronne recherchait, qu'un alerte commandant militaire, prêt à toutes les éventualités.

Le débonnaire, mais opiniâtre souverain, George III, crut l'avoir découvert dans l'habile homme de guerre qui lui revenait d'Amérique, fier de ses états de service à Philadelphie, aux Florides, à New-York, à Montréal, et aux Trois-Rivières.

Plein d'énergie, lettré, organisateur, familier avec la langue, les mœurs, les us et coutumes du pays, Haldimand accepta la tâche sans hésiter, ne se doutant guère, comme bien d'autres de nos proconsuls, peut-être, que le temps viendrait, où il demanderait à être relevé de son commandement, sans en attendre l'expiration du terme.

## II

Frédéric Haldimand naquit à Yverdon, canton de Berne, Suisse, vers 1732. C'était un bel homme, d'une haute taille, d'un physique imposant, d'un commerce agréable. Il était célibataire. Bibaud lui reconnaît de l'esprit, des talents, des connaissances<sup>1</sup>.

Bien jeune, il alla faire ses premières armes dans les légions du roi de Sardaigne. Puis, désireux de se perfectionner dans le métier de la guerre, il se fit inscrire aux cadres militaires du roi de Prusse. Trois années plus tard, il était nommé lieutenant aux Gardes, avec le rang de lieutenant-colonel. En 1754, Haldimand acceptait du service dans l'armée anglaise. Conjointement avec son ami, Henri Bouquet, fort distingué plus tard, il recevait un brevet de colonel dans le 60e *Royal American*, qui venait d'être levé dans les provinces anglaises d'Amérique.

Le conflit prolongé entre l'Angleterre et la France, commencé en 1755, lui procura bientôt l'occasion de manifester au grand jour ses aptitudes militaires. En 1756, on lui assigna un commandement à Philadelphie. L'assaut malheureux que les Anglais entreprirent contre la position retranchée de Montcalm, le 8 juillet 1758, à Ticonderoga (Carillon), fit ressortir avec avantage la bravoure et l'habileté de Haldimand.

Le général Prideaux, se dirigeant sur Niagara, en 1759, avait laissé ce dernier à Oswego, pour y construire un fort comme dépôt de provisions et de munitions de guerre pour l'armée anglaise.

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<sup>1</sup> *Histoire du Canada*, Bibaud, t. II, p. 81.



Le colonel Haldimand avait 1,000 hommes sous ses ordres. Le marquis de Vaudreuil y dépêcha un corps d'armée beaucoup plus considérable, sous la conduite du chevalier de La Corne, pour s'emparer de ce poste, qui était d'une importance vitale ; car, une fois ce fort au pouvoir de l'ennemi, les soldats de Prideaux se seraient trouvés sans provisions ni munitions de guerre, à deux cents milles de leurs quartiers généraux.

Le commandant avait si bien concerté ses plans de défense, qu'il résista victorieusement aux rudes assauts qu'il eut à subir, le jour aussi bien que la nuit, de la part de La Corne aidé de 600 sauvages.

Le poste se maintint, et, deux jours plus tard, le général Prideaux ayant trouvé la mort dans une attaque, sir William Johnston écrivit au colonel Haldimand de venir prendre le commandement de l'armée anglaise.

On retrouve le jeune colonel, l'année suivante, à la capitulation de Montréal. Haldimand fut chargé d'organiser le service des vaisseaux pour faire repasser en France les soldats français. Il séjourna dans cette ville jusqu'au mois de juin 1762. A cette date, on lui confia le commandement des Trois-Rivières, comme *locum tenens*, en l'absence du colonel Burton chargé d'aller conquérir la Havane.

Sa nationalité étrangère l'avait d'abord exclu de plusieurs charges de confiance, qu'un sujet britannique pouvait seul occuper. En 1762, un statut du parlement impérial lui vint en aide. Haldimand, en sa qualité d'officier du régiment *Royal American*, fut déclaré l'égal de tout sujet anglais, et, comme tel, habile à remplir les emplois les plus élevés.

Il se dévoua à rétablir l'ordre dans son gouvernement des Trois-Rivières, à y développer, entre autres industries, celle des forges de Saint-Maurice, en arrière de cette ville, sur lesquelles sa correspondance contient d'amples détails.

Il n'aimait pas les procès, et les Trifluviens, comme les Normands, tenaient fort à plaider. Haldimand s'étudia à les guérir de cette manie ; il mit au ban les avocats, et préconisa l'arbitrage à l'amiable. Puis il se crut en droit d'adresser à lord Amherst, le gouverneur général, un rapport favorable sur l'esprit pacifique et l'amour du progrès chez ses administrés.

C'est en 1762 que Haldimand faisait la connaissance de Pierre Roubaud, tristement célèbre dans la suite.

Au retour du colonel Ralph Burton, en mars 1763, Haldimand se démit de sa charge ; mais, Burton et le général Gage ayant tous deux refusé le commandement des Trois-Rivières, Haldimand y fut nommé définitivement.

En mars 1764, le général Amherst ayant demandé un contingent de trois cents miliciens pour châtier une tribu sauvage, les Trois-Rivières étaient tenues de fournir soixante hommes pour leur part. Amherst suggérait d'offrir de l'argent à qui voudrait s'enrôler. Ce mode répugnait aux Canadiens, qui s'imaginaient que ce système de service militaire les constituerait soldats pour le reste de leurs jours. Haldimand agit autrement, et ses recrues, prises aux Trois-Rivières, soumises plus tard à l'inspection du général Gage à Montréal, furent déclarées les meilleures troupes du contingent.

L'année 1764 est notable dans la correspondance de Haldimand, comme l'a fait remarquer M. Brymner. C'est dans une de ses lettres, portant cette date que l'on rencontre la première mention de l'esprit de révolte, qui, onze ans plus tard, dans la Nouvelle-Angleterre, devait conduire les provinces anglaises à l'indépendance, et dont le prétexte

était "la taxe que la mère patrie entendait imposer pour payer le coût de la dernière guerre au Canada."

En 1767, Haldimand, qui attendait sa promotion au grade de général de brigade, fut nommé au commandement militaire des Florides. Il y trouva la colonie entière en désordre, les soldats du roi décimés par la maladie, le pays en proie à des dissensions intestines, l'anarchie parmi les employés civils et militaires, une bureaucratie impatiente de tout frein. Il s'efforça, aux Florides, comme dans ses autres gouvernements du reste, de faire renaître l'ordre et le respect pour l'autorité, améliora l'état sanitaire des garnisons, procura aux troupes une nourriture plus saine, tout en luttant contre des obstacles presque insurmontables.

En 1772, il visitait le pays à l'ouest de Mobile, dont il trace une triste peinture. Partout régnaient le mécontentement et des aspirations vers une sauvage indépendance.

Au printemps de 1773, le général Gage, ayant monté en grade, se préparait à quitter New-York. Il expédia un vaisseau aux Florides, pour en ramener Haldimand, son remplaçant dans le gouvernement militaire de New-York. Peu de temps après son installation, Tryon, le gouverneur de New-York, et son conseil, requéraient le général Haldimand d'envoyer un corps de troupes pour réprimer des soulèvements dans *Charlotte County*. Les émeutiers avaient incendié le moulin du colonel Reid, et saccagé ses fermes. On lui enjoignit de placer des troupes aux postes de Ticonderoga et Crown Point, pour prêter à l'autorité main-forte au besoin, avec prière de tenir secrètes ses démarches, attendu que l'on redoutait la présence d'espions venus du New-Hampshire.

On le rappelait à Londres, en août 1775, pour faire rapport de l'état actuel des colonies, anglaises ; et le 1er janvier 1776, il était nommé général en Amérique.

A l'automne de 1777, le roi le chargeait de prendre la place de sir Guy Carleton, froissé de l'injustice qu'on lui avait faite, après sa brillante défense de Québec, en donnant au général Burgoyne le commandement en chef de l'armée destinée à opérer de ce côté contre les provinces en révolte. Haldimand arriva à Québec le 30 juin 1778.

Tout faisait présager pour l'Angleterre, même en 1774, une rupture prochaine et sérieuse avec ses anciennes colonies, auxquelles elle tenait comme à la prune de ses yeux.

Il était de saine politique pour elle de rester en bons termes avec la France, au cas où cette dernière, pour se venger de la perte humiliante du Canada, serait tentée d'envoyer des secours aux provinces rebelles. Le cabinet de Saint-James, dans le but d'engager la France à se tenir à l'écart de la grande querelle anglo-saxonne qui se préparait, avait, dès 1775, laissé entendre à la cour de Versailles qu'on consentirait à lui remettre le Canada.

La France monarchique refusa l'offre, délia sa bourse<sup>1</sup>, laissa grandir le conflit quelque

<sup>1</sup> La première offrande de la France aux provinces anglaises révoltées, 1,000,000 de livres tournois, se fit le 10 juin 1776, vingt-quatre jours avant la déclaration de leur indépendance, tel qu'il appert par le reçu du négociateur du subside, Beaumarchais.

"Lignes mémorables, remarque l'écrivain américain, John Bigelow, destinées à avoir plus de retentissement qu'aucun autre nombre égal de lignes tracées par la plume féconde de celui qui était à la fois poète, dramaturge, homme de cour et spéculateur."

"J'ai reçu de M. Du Vergier, conformément aux ordres de M. de Vergennes, en date du 5 du courant, que je lui ai remis la somme d'un million dont je rendrai compte à mon dit sieur de Vergennes.

"Bon pour un million de livres tournois.

"A Paris, le 10 juin 1776."

temps, et en 1778, elle expédiait une armée et une escadre, sous le commandement du jeune marquis de Lafayette et du comte d'Estaing, pour aider aux provinces révoltées à secouer le joug monarchique et à fonder une république.

Sa vaillante petite armée lui revenait plus tard couverte de gloire, lui rapportant, avec d'inutiles lauriers, la doctrine de la Révolution triomphante de l'autorité, — doctrine qui, aidée des encyclopédistes et du refus des classes privilégiées, la noblesse et le haut clergé, de contribuer volontairement aux impôts qui écrasaient le peuple, devait, quelques années plus tard, conduire le roi de France à l'échafaud.

### III

Les troupes canadiennes avaient infligé à Montgomery et à Arnold une mémorable défaite. En mai 1776, pour l'envahisseur du sol attardé au Canada, c'était un sauve-qui-peut général ; la colonie était à l'abri pour cette année.

Pendant l'hiver de 1778, le général Gates, sans consulter Washington, avait fait agréer au Congrès le projet d'une seconde invasion du Canada, laquelle devait avoir lieu sous le général Lafayette<sup>1</sup>. Le jeune et chevaleresque marquis devait se mettre en marche d'Albany, traverser le lac Champlain sur la glace, incendier les vaisseaux anglais mis en hivernement à Saint-Jean, et investir Montréal.

Lafayette, averti par le général Gates de sa nomination à ce commandement, fut invité à se rendre à Yorktown pour recevoir des instructions. En apprenant que ce projet avait été formé à l'insu de son illustre ami Washington, et que ce dernier ne l'approuvait pas, Lafayette déclina l'honneur qu'on lui offrait, bien que Washington, pour ne pas froisser son brillant jeune lieutenant, crût devoir l'encourager à entreprendre cette campagne. Le Canada échappa donc encore une fois à un grand danger, mais ce n'était que partie remise. L'on voit par une lettre du colonel Johnston<sup>2</sup> au général Haldimand, en date du 3 mai 1779, qu'une nouvelle tentative d'invasion était à l'ordre du jour, cette fois, sous les auspices de Washington lui-même.

Le 9 juin 1775, le général Carleton avait proclamé la loi martiale à Québec. Il est permis de croire que, à partir de cette date jusqu'à la signature du traité de paix, en 1783, la ville, régie par la loi martiale, ressemblait un peu à une forteresse en état de siège, ou au moins à une place forte en proie à de perpétuelles alarmes. Ce n'était qu'un va-et-vient de courriers, d'émissaires secrets, porteurs de dépêches, de Québec au Détroit, à Niagara, au Vermont, à New-York. Des levées de miliciens se faisaient. La Corne organisait ses sauvages et se mêlait à leurs hordes farouches pour neutraliser parmi elles l'effet des promesses que le Congrès leur faisait. Chaque semaine Québec ouvrait ses portes aux familles effarées des "loyalistes" cherchant sur notre sol un refuge contre la persécution. Les uns pénétraient au Canada à travers les forêts du Maine et du Vermont, d'autres y venaient sur des vaisseaux nolisés à cet effet à New-York, ou dans les autres ports des provinces révoltées. Haldimand établit ces réfugiés à Yamachiche, à Gaspé, à Sorel, etc.

La rade de Québec, durant la belle saison, était encombrée de navires marchands,

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<sup>1</sup> *Life of Washington*, by Washington Irving, vol. III, p. 370.

<sup>2</sup> *Haldimand Papers*.

attendant le départ des frégates pour profiter de leur escorte, ainsi que de vaisseaux de guerre chargés de troupes ou de munitions pour l'armée.

Deux incidents paraissent avoir fort préoccupé Haldimand : l'établissement au Canada des "loyalistes," et les négociations nouées avec le Vermont.

Burgoyne, avec ses soldats anglais et allemands, débarquait dans notre port le 8 mai 1776. Le séjour de Québec, évidemment, n'était pas gai. A chaque instant les sentinelles ouvraient les portes de la ville pour recevoir, tantôt des escouades militaires conduisant des prisonniers de guerre pris sur les frontières ou près des postes où ils se faufilaient sournoisement, tantôt les paysans encombrant les routes avec leurs convois de provisions, et maugréant sur ces affreuses corvées qui les arrachaient à leurs occupations journalières. Il n'y avait dans tout le Canada qu'une seule place forte, Québec, éprouvée comme telle, où les prisonniers de guerre et quelques détenus politiques étaient écroués. La tâche du commandant ou gouverneur de Québec, chaque jour, chaque nuit, était d'examiner les lettres et les réquisitions qu'on lui adressait, de préparer et de transmettre ses instructions aux postes éloignés, de se concerter avec le commandant en chef de l'armée anglaise, le général Clinton, à New-York ou ailleurs, pour déjouer les complots des émissaires secrets du Congrès, ou des traîtres qu'il soupçonnait en dedans ou en dehors des murs.

Un jour le général recevait un parlementaire du Vermont<sup>1</sup>, province qui méditait de se détacher de New-York ; le lendemain il s'agissait de préparer la feuille de route d'un détachement militaire, ou d'assurer les moyens de transport, par eau ou par terre, des armes et bagages du corps de troupe du général Riedesel se rendant au théâtre de la guerre ou en revenant, avant de repasser l'océan en 1783.

Accablé de travail, de correspondance — tel qu'en fait foi l'énorme masse de documents entassés dans nos archives — le commandant de notre citadelle avait peu de loisirs pour temporiser avec l'émeute ou parlementer avec la sédition. Sans autre boussole que le jugement droit que la Providence lui avait départi, sans autre guide que la loi martiale, il se peut qu'il ait quelquefois manqué aux règles de la prudence ; mais l'histoire doit lui savoir gré d'avoir gouverné la colonie, dans cette période de crises et d'alarmes, sans effusion de sang.

La morte saison de l'hiver semble lui avoir donné quelque répit. Pris d'un beau zèle pour les lettres, on le trouve organisant, avec l'aide de l'évêque Briand, une bibliothèque publique, plus tard le *Quebec Library Association*, politiquement reconnue vers 1805. La *Gazette de Québec*, du 22 janvier 1779, contient le compte-rendu de l'assemblée des citoyens, à l'évêché, sous son patronage et sous celui de l'évêque, de la nomination comme syndics, du supérieur du séminaire de Québec, l'abbé Grave, du juge Mabane, de MM. Baby, Fargues et Monk, avec Robert Lester comme trésorier, et Arthur Davidson comme secrétaire ; prix d'entrée £5 ; souscription annuelle, £2. Puis Haldimand employa à Londres, comme agent pour l'achat de livres, Robert Cumberland, l'auteur dramatique. Cette bibliothèque a existé quatre-vingt-dix ans. En 1869, elle était réunie à celle de la *Société Littéraire et Historique de Québec*.

On cherche en vain, dans la correspondance de Haldimand, les traces de l'incident

<sup>1</sup> Les négociations avec l'Etat du Vermont, dit M. Brymner, commencèrent en mars 1779, et dans le cours de cette année, Ethan Allen promit à sir Henry Clinton qu'il lèverait un corps de 4,000 hommes pour attaquer les Américains, et que ses munitions de guerre étaient toutes prêtes. Clinton conseilla à Allen de se replier sur le Canada, et d'agir de concert avec Haldimand et sous ses ordres. *Rapport de l'archiviste*, 1887, p. XVII.

romanesque auquel l'amiral Nelson, alors capitaine du brick de guerre l'*Albemarle*, fut mêlé à Québec, en 1782. Je crois avoir été le premier à signaler dans les *Maple Leaves* et *Quebec Past and Present*, cette curieuse page dans l'existence du futur amiral, sur les renseignements fournis par Robert Southey et Lamartine, dans leur biographie de l'amant de lady Emma Hamilton. L'historien Miles a consacré un excellent article de revue à décrire la passion de Nelson pour la ravissante Québécoise, miss Mary Simpson.

Les fortifications de Québec avaient fort préoccupé les ingénieurs militaires en 1775. Le capitaine Twiss, du génie, plus tard général, avait fourni en 1782, le plan d'une citadelle provisoire sur le cap Diamant, que Haldimand adopta. Il avait aussi conçu le projet d'un canal aux Cèdres, pour faciliter le transport des provisions pour l'armée<sup>1</sup>.

Homme de goût et admirateur des beaux sites autour de Québec, il construisait en 1779-82, la jolie villa que le prince Edouard, père de la reine Victoria, occupait, près de la chute de Montmorency, en 1791-4<sup>2</sup>. Un belvédère pittoresque, penché sur l'abîme écumeux, lui permettait de faire admirer à la belle baronne de Riedesel, en 1782, le paysage dans toute sa sauvage majesté. Le 5 mai 1784, il posait avec une grande solennité la première pierre de l'annexe du château Saint-Louis (brûlé en 1834), qui depuis a été connue sous le nom de château Haldimand, lequel devait servir pour les bals et les réceptions, qui auparavant avait lieu au château Saint-Louis même.

Voyons le milieu social où vivait le général Haldimand à Québec.

D'abord, on remarque, aux salles d'audience, le juge en chef Livius, les juges Mabane, Fraser, de Rouville ; parmi les hommes de loi les deux Cugnet, Juchereau, Pressard, J. A. Panet, Berthelot d'Artigny ; — ce dernier signe avocat et notaire.

Le R. P. Glapion, supérieur des jésuites expulsés, voit avec chagrin les salles de son lycée chéri encombrées par une soldatesque effrénée ; des g...d... anglais retentissent là où naguère régnait le silence ou les pieuses oraisons. Le monastère des ursulines, l'antique séminaire des Missions étrangères, continuent de donner leurs cours, comme aux jours du vénéré évêque de Pétrée, et fournissent à la société des mères exemplaires, au sacerdoce des membres zélés.

Les hospitalières s'efforcent, comme par le passé, d'alléger les maux et les défaillances de l'humanité souffrante. Le *Quebec Gazette*, fondé en 1764 par Brown et Gilmore, imprimeurs venus de Philadelphie, publiait chaque semaine, avec les proclamations officielles à la première page, les décrets de vente au bureau du shérif, qui se tenait, ainsi que le

<sup>1</sup> En 1779, Haldimand fit ériger des fortins sur la rivière Saint-François-du-lac, et le capitaine Moses Hazen, d'après les ordres du même gouverneur, ouvrit une route entre Saint-François-du-lac et la région du lac Champlain. Jusqu'à ce moment, la rivière Saint-François avait été une route de guerre, qui servait surtout aux Canadiens pour aller attaquer les colonies anglaises, et qui, après 1775, pouvait devenir une voie favorable aux invasions des Américains. Remarquons que, en 1759, le major Rogers était parti du lac Champlain et était venu saccager la bourgade des Abenakis, à Saint-François, par les terres ou Hazen traça sa route en 1779. (*Note de B. Sulte.*)

<sup>2</sup> Le Dr Adam Mabane, né à Edimbourg, en Ecosse, vers 1734, était cousin du poète James Thomson, le chantre des *Saisons*. Débarqué à New-York, il vint à Québec en 1764, fut nommé chirurgien de la garnison, puis, appelé au conseil du général Murray, et associé comme juge à l'organisation judiciaire de la colonie. Le général Carleton fut blessé de l'indépendance de ses idées, et trouvait qu'il abondait trop dans le sens des Canadiens. Il fut exclu du Conseil, mais continua à agir comme juge avec Fraser et de Rouville.

La bureaucratie qui entourait sir Guy Carleton, en 1786, avait pris Mabane en grippe ; deux ans plus tard, sa commission fut révoquée en Angleterre. Il mourut le 3 janvier 1792, à Samos (Woodfield). Le beau domaine qu'il avait acquis à Sillery, en 1769, fut occupé plus tard par l'honorable Wm Sheppard, et récemment par feu James Gibb, ancien président de la Banque de Québec.

tribunal, au collège des jésuites, puis des entrefilets sur la guerre et le commerce en Europe. Quelquefois on s'y hasardait à faire de rares et discrètes réflexions sur l'état de la province. La feuille contenait aussi les réclames des commissaires-priseurs, des épiciers et des marchands de vins de la basse ville.

Montréal, grâce à Fleury Mesplets et à Jotard, un avocat français, grand anglophobe, — tous deux de dignes échos de Du Calvet, possédait une petite feuille du genre "libelleux," la première de cette espèce sur le continent par ordre de date, et intitulée : *Tant pis, tant mieux*.

Parmi les figures marquantes de l'époque, nommons encore les deux Lymburner : l'aîné, Adam, homme fort en droit public, délégué auprès de la métropole en 1791 pour faire des représentations à propos de la nouvelle constitution ; et son frère Mathew, négociant distingué. Le troisième frère, John, avait péri en mer, en 1776. Ajoutons-y le nom du colonel Lecompte-Dupré, loyal commandant des milices canadiennes-françaises, et qui mérita cette distinction pour avoir déjoué un complot ourdi par les sentinelles préposées à l'une des portes de la ville, pendant le siège. Elles devaient laisser pénétrer les Bostonnais par une petite ouverture dans le mur, près d'une des poudrières. Les Bostonnais se vengèrent du colonel en ravageant une de ses métairies, près de Québec.

Il est un nom qui revient constamment dans cette volumineuse correspondance Haldimand, c'est celui du secrétaire et aide de camp du général, le major Robert Mathews, qui succéda, en 1779, au capitaine Foy, mort cette année-là.

Le major Mathews épousa plus tard Mary Simpson, la belle Québecquoise dont l'amiral Nelson raffola au point de faillir quitter le service de sa patrie, et renoncer ainsi à l'apothéose qui lui était réservée dans l'abbaye de Westminster. Qui eût alors osé prédire à l'amoureux marin, que vingt ans plus tard, il lui serait donné de changer la carte de l'Europe au bénéfice de la Grande-Bretagne ? Mathews, devenu colonel, est mort gouverneur de l'hôpital de Chelsea, à Londres.

Chaque 31 décembre, Haldimand avait à faire acte de présence au banquet patriotique organisé pour commémorer la déroute des Bostonnais au Saut-au-Matelot et à Près-de-ville. Là trônaient, à côté des vétérans des Plaines d'Abraham, le major Samuel Holland, le colonel H. Caldwell, Fraser, James Thompson et autres, les preux de 1775, Taschereau, Finlay, Collins, Le Maître, La Naudière, Lecompte-Dupré, Nairn, Dambourgès, Thomas Ainslie. Haldimand avait pour intime le juge Mabane qui résidait à Sillery, dans son délicieux manoir de Samos. Là, nous dit l'abbé Bois, Son Excellence allait de temps à autre jouer une partie de cartes.

## VI

Revenons à l'irréconciliable Du Calvet. Son programme se résumait à critiquer ouvertement et sans mesure les démarches du général Haldimand, résolu de protéger le pays contre l'invasion<sup>1</sup>. Ce dut être une tâche un tant soit peu dangereuse dans une con-

<sup>1</sup> Chez les sieurs Cazeau, Hay, La Terrière, le mécontentement apparent, dit Bibaud, fut au fond une véritable conspiration contre le gouvernement. BIBAUD, *Histoire du Canada*, vol. III, p. 82.

NOTE: "François Cazeau parvint à s'échapper de prison, et à atteindre les Etats-Unis, après quelques mois d'errements dans les forêts ; mais, malade de corps et d'esprit, et ruiné. Il avait employé son immense fortune à servir les Américains, croyant en même temps servir la France, son pays natal." BIBAUD.

trée soumise aux rigueurs inexorables de la loi martiale, sous un chef accoutumé à la discipline des camps, qu'il avait étudiée dans les armées du farouche roi de Prusse.

Le général au lieu de traduire devant une cour civile ou militaire les partisans de la résistance à l'autorité, se contenta d'écrouer temporairement les chefs, comme prisonniers politiques, au couvent des récollets, en face même de sa demeure, le château Saint-Louis.

Le général Carleton ne s'était pas donné la peine de consulter à ce sujet l'évêque Briand, quand il avait eu besoin de cet édifice pour y caser une notable partie des 426 prisonniers arrêtés au Saut-au-Matelot, le 31 décembre 1775. Son successeur fit mieux ; il adressa une lettre en termes polis à l'évêque Briand, qui lui permit d'user comme il l'entendrait du vieux monastère franciscain.

Les prisons de Québec étaient insuffisantes pour les nombreux prisonniers de guerre que l'on capturait chaque jour.

Parmi les détenus de 1778 à 1782, il y avait plusieurs individus, tant anglais que canadiens-français <sup>1</sup> qui s'étaient déclarés pour le Congrès, ou qui étaient suspects. Les uns avaient porté les armes, d'autres avaient fourni des renseignements, des munitions, des provisions à l'ennemi. L'appât du gain avait été irrésistible pour un bon nombre, ainsi que les promesses des partisans du Congrès : Carroll, Franklin, et Lafayette. On mit sous la garde du R. P. de Berrey, comme suspects, un maître-tonnelier, Charles Hay, François Cazeau, Pierre Du Calvet, Isidore Mesplets, Jotard, le docteur Pierre de Salles La Terrière, et quelques autres moins connus.

Tels étaient les principaux prisonniers d'Etat du régime militaire de cette orageuse période. Bien que le mode de détention permit à chaque captif d'avoir une chambre à lui, de la fermer à clef le soir ; bien que les dames et les messieurs, leurs parents et amis eussent permission de les visiter le jour et même pendant la nuit, la perte de leur liberté était intolérable aux pauvres détenus.

Du Calvet a tracé un bien sombre tableau de sa vie de prison ; beaucoup trop sombre, au dire du R. P. de Berrey, qui, dans un mémoire intitulé : *Répliques aux calomnies de Pierre Du Calvet contre les récollets de Québec*, a fait, sous serment, bonne justice des *exagérations* du calviniste surexcité. Faribault nommait ces exagérations "des caricatures."

Malgré la sympathie de la tendre amie de Pierre de La Terrière, qui passait ses jours et ses nuits à consoler le beau, l'athlétique et spirituel inspecteur des forges de Saint-Maurice de la perte de sa douce liberté, il est clair que l'atmosphère du couvent des récollets ne lui allait guère. Sa paix domestique même fut gravement troublée par les ébats et les intrigues galantes de deux de ses compagnons de geôle : Mesplets et Jotard, des ivrognes avérés.

Pierre de La Terrière jure ses grands dieux qu'il n'avait jamais entretenu d'intelligences avec les *congréganistes* de New-York ; nous aimons à le croire, bien que les apparences soient contre lui. Comme bien d'autres, il ne subit aucun procès, excepté un interrogatoire devant le juge de Rouville, MM. de Tonnancour, Conrad Gugsy et M. Baby. Plaignons cette victime des jours néfastes.

Il manquait au monastère du P. de Berrey une autre curieuse figure du temps : celle

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<sup>1</sup> Le colonel Livingstone avait assemblé un corps de 300 Canadiens pour attaquer la porte Saint-Jean, pendant l'assaut du Saut-au-Matelot, le 31 décembre 1775.



du traître et habile scribe que Du Calvet se choisit plus tard, à Londres : l'ex-jésuite Roubaud. Ce misérable causa à son ordre et au gouvernement bien des ennuis. (*Voir l'appendice.*)

L'ennemi le plus acharné que Haldimand eût au Canada fut sans contredit ce même Du Calvet<sup>1</sup>.

Il a été célébré en beaux vers par notre poète Fréchette, mais Du Calvet chanté par les poètes est un tout autre personnage que Du Calvet connu de la froide et impartiale histoire.

La correspondance officielle, récemment obtenue au Musée Britannique, nous le révèle sous un jour tout autre que celui sous lequel il nous est présenté par quelques écrivains.

Si l'ami de Pierre Roubaud est "le premier des martyrs de la cause canadienne," au dire du *Canada Reconquis*, en fouillant les documents qui nous sont maintenant accessibles, on se convaincra qu'il n'est pas mûr pour la canonisation. Le contenu de la correspondance officielle est plus que suffisant pour justifier l'avertissement de Bibaud et autres, quand ils citent des passages de Du Calvet<sup>2</sup>.

Pierre Du Calvet avait, avant 1759, fait des profits considérables dans la traite des pelleteries. Ayant opté pour rester au Canada, après la capitulation, et étant de plus par sa croyance religieuse (il était calviniste) habile à remplir certaines charges sous le gouvernement anglais, on le nomma juge de paix. Il fut un excellent magistrat : ses talents, ses lumières, sinon son désintéressement, le recommandèrent à l'attention.

On a de lui un mémoire en langue française et anglaise, sa *Lettre à messieurs les Canadiens*, du 9 avril 1784, publiée à Londres, et son *Appel à la justice de l'Etat*.

Le plan<sup>3</sup> de constitution suggéré par Du Calvet diffère si peu de la constitution de 1791, que l'on serait tenté de croire qu'il en a fourni le canevas.

Roubaud lui nie des talents littéraires, se fondant sur les connaissances que sa position de scribe et de secrétaire confidentiel de Du Calvet lui avaient procurées sur son patron.

Le volume (B. 206) de la correspondance officielle de Haldimand contient là-dessus de curieuses révélations ; mais je préfère m'en tenir au témoignage de Du Calvet, qu'à celui de l'ancien missionnaire des Abenakis de Saint-François, Pierre Roubaud, le double traître. Du Calvet savait écrire ; je ne sais si l'on pourrait en dire autant de son détracteur.

Du Calvet, de retour en Angleterre, trouva un généreux protecteur dans le baron Mazères, excellent homme au demeurant, mais qui, au dire de sir Guy Carleton, n'avait

<sup>1</sup> Pierre Du Calvet, en vertu d'un mandat d'arrêt de Haldimand, fut enfermé, le 29 septembre 1780, à bord du *Canceaux*, vaisseau de guerre en rade à Québec. Le 14 novembre 1780, on le transféra à la prison militaire. Il y demeura jusqu'au 13 décembre 1781. Le prévost martial Miles Prentice le conduisit ce jour-là aux cellules du couvent des récollets, et le plaça sous la garde du R. P. de Berrey ; il fut élargi le 2 mai 1783, après avoir subi une détention de deux ans et huit mois. Il suivit Haldimand en Angleterre, au départ de ce dernier, le 26 novembre 1784, dans l'*Atalante*, et le dénonça aux tribunaux de Londres pour emprisonnement illégal. En revenant du Canada à Londres, par la voie de New-York, le vaisseau dans lequel il était sombre en mer dans une furieuse tempête, pendant l'équinoxe hivernale. Ce vieux vaisseau, le *Sherburne*, capturé par les Anglais sur les Espagnols, avait fait voile de New-York, le 15 mars 1786. Le fils de Du Calvet vivait à Londres en 1795, protégé par Masères.

<sup>2</sup> "Il faut toujours se rappeler que Du Calvet est un écrivain exagérateur." *Histoire du Canada*, t. II, p. 31.

<sup>3</sup> En voici un résumé : 1o — La jurisprudence française ; 2o — La loi de l'*habeas corpus* et le procès par jury. 3o — Une chambre d'assemblée sur un plan général d'économie électorale ; 4o — La liberté de la presse ; 5o — La formation d'un régiment à deux bataillons ; 6o — L'établissement de collèges pour l'éducation de la jeunesse.



pu pardonner aux Canadiens-français de professer le culte qui avait inspiré la révocation de l'édit de Nantes, et qui avait fait bannir ses aïeux du sol français. Du Calvet avait des griefs personnels contre le gouverneur de Québec ; le général s'était emparé de ses hangars pour y déposer les munitions des troupes ; on avait endommagé sérieusement ses pelleteries.

Quant au premier chef, il appert, par la correspondance, que le gouvernement lui fit toucher six cents louis pour l'usage de ses maisons de commerce pendant le siège, et qu'il demanda un prix si élevé pour ses marchandises que le gouvernement, malgré le désir qu'il en avait, dut abandonner l'idée de les acquérir.

Ses intelligences avec le Congrès, qui furent cause de son emprisonnement, devaient être notoires, puisqu'il réclama lui-même de Franklin<sup>6</sup>, l'envoyé du Congrès, une indemnité pour services rendus.

Que les cours civiles en Angleterre lui aient, en certaines occasions, donné gain de cause contre Haldimand, cela prouve tout au plus le respect de la loi en ce pays pour la liberté du sujet, et démontre que, même un gouverneur militaire régissant une colonie soumise à la loi martiale, ne peut mettre entièrement de côté la loi civile. Le roi de la Grande-Bretagne, satisfait de la conduite de son lieutenant à Québec, acquitta généreusement les dommages-intérêts accordés par jugements rendus contre le général Haldimand.

Grâce aux difficultés insurmontables qui existaient, dans le passé, pour qui voulait se renseigner aux sources sur les premières années de la domination anglaise dans notre pays, il n'est pas étrange que les historiens aient à réformer plus d'un jugement rendu sur les hommes et les événements du temps. De tous les historiens de la période, William Smith me semble le moins excusable.

Etabli à Québec dès 1786, et ayant vécu du temps du général Haldimand, puisqu'il était âgé de vingt-deux ans en 1791, au moment de la mort du général, M. Smith aurait dû se renseigner plus minutieusement auprès de ses contemporains sur l'administration d'un homme qu'ils avaient vu et connu, ayant de faire le récit de cette administration dans son histoire publiée à Québec, en 1815.

Il se borne à dire que l'administration du général Haldimand a été jugée à divers points de vue, et que, s'il a causé des mécontentements dans la colonie, c'est probablement qu'en sa qualité d'étranger il n'en connaissait pas les us et coutumes. Haldimand n'avait pas assez de facilités pour se renseigner sur le Canada.

Des écrivains venus après lui s'appesantissent sur le sombre despotisme de Haldimand, sur les arrestations par centaines des personnes les plus marquantes, sur les corvées dont le peuple était écrasé pour le transport des troupes et de leurs bagages vers la frontière.

Si Haldimand eût été un farouche despote, entouré qu'il était de provinces révoltées, loin de se contenter d'emprisonner au monastère des récollets des traîtres avérés comme Cazeau et Du Calvet, il eût pu, selon les idées du temps et selon la loi qui punit la haute trahison, et d'après les preuves qu'il avait en mains, leur faire subir un procès sommaire et les pendre. Soit pour ne pas froisser trop le peuple, soit par instinct d'humanité, il s'abstint.

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<sup>6</sup> GARNEAU, *Histoire du Canada*, t. III, p. 52, Ed. de 1882.

Les prisons regorgeaient de détenus, mais la plupart étaient des prisonniers de guerre, des partisans ou émissaires reconnus du Congrès.

Il est indubitable que l'on n'emprisonnait pas les citoyens par centaines, sur de simples soupçons ; et le contenu de la lettre du général au colonel de Specht, le commandant à Montréal, en date du 22 novembre 1781, en fournit une bonne preuve.

Quant aux corvées onéreuses, les Canadiens n'en avaient jamais connu d'autres sous le régime français qui venaient de clore. Bigot et ses satellites ne se contentaient pas d'imposer simplement des corvées, ils s'appropriaient les blés et les bêtes de ferme des paysans qu'ils indemnisaient plus tard à des taux qu'ils fixaient eux-mêmes, ou avec le papier-monnaie de la colonie, dont on put découvrir, hélas ! plus tard la juste valeur.

La correspondance Haldimand jette du jour sur ces terribles corvées et leur enlève une grande partie de leur côté odieux.

En somme, tout en admettant avec l'historien Garneau que le régime militaire de Haldimand eût pu être plus doux durant son administration, je suis porté à croire que la correspondance officielle le présentera sous un nouvel aspect, et, comme se plaît à le reconnaître le même éminent historien, "que peu de personnes probablement refuseront de lui pardonner ses allures brusques et despotiques en faveur des mesures qu'il fit adopter pour nous conserver une partie du sol découvert et livré à la civilisation par nos ancêtres<sup>1</sup>."

J'inviterai donc les amateurs de l'histoire à feuilleter attentivement cette volumineuse correspondance, dont une notable partie est en langue française.

Une jeune muse canadienne chantait, en 1779, le "Despote", — le sombre tyran. Le parnasse canadien s'est amélioré depuis.

"VERS A SON EXCELLENCE LE GÉNÉRAL HALDIMAND, POUR LE 1<sup>ER</sup> JANVIER DE L'AN 1779.

Non jamais, Haldimand, ma plume encor novice  
A ménager les grands n'employa l'artifice.  
Qu'un vain peuple, séduit par l'éclat des grandeurs,  
Prodigue son encens aux frivoles honneurs,  
Et, poussant à l'excès la vile flatterie,  
Porte ses vœux outrés jusqu'à l'idolâtrie ;  
Qu'il n'admire jamais que l'éclat d'un grand nom,  
Mon cœur, mon jeune cœur, malgré l'illusion,  
Ne s'est point abusé sur les grandeurs humaines ;  
Il sait que ces grandeurs sont toujours incertaines.  
J'admire les vertus qui décorent ton rang,  
La magnanimité, la beauté de ton sang ;  
Mais, aussi vertueux, la fortune volage  
Eût pu ne point te faire un si noble partage.  
Tu pus naître aussi bien le fils d'un laboureur,  
Dont l'état trop obscur voilerait la candeur.  
Heureux, trois fois heureux, celui dont la sagesse  
Accompagne le rang, les titres de noblesse !

<sup>1</sup> GARNEAU, *Histoire du Canada*, t. III, p. 49. Ed. de 1882.

Heureux qui, comme toi, joint à la dignité  
Les sentiments d'honneur, de générosité,  
Un cœur toujours sensible, une âme secourable,  
Aux grandeurs où t'élève un destin favorable !  
Depuis que tu commandes et nous donnes des lois,  
Chaque jour est marqué par autant de bienfaits  
Dont ta main prend plaisir à verser l'abondance  
Sur nos têtes courbées sous la reconnaissance.  
Mais ton cœur généreux ne peut être content,  
S'il ne nous enrichit d'un plus noble présent :  
Emule des savans, jaloux des connaissances,  
Tu connais la valeur et le prix des Sciences.  
Les Lettres et la Lecture occupent ton loisir,  
Voilà ton seul penchant, ton unique plaisir.  
Partageant avec nous cette douce habitude,  
Tu parais désirer que nous aimions l'étude.  
Haldimand, Haldimand, quelles Divinités  
Ont dirigé tes pas sur ces bords éloignés,  
Pour y faire briller les Lettres et la Science  
A travers les brouillards d'une épaisse ignorance ?  
Les Dieux te réservaient cet emploi glorieux ;  
Achève ton ouvrage et nous serons heureux.  
Riante perspective, avenir qui m'enflamme,  
Douce et flatteuse idée, que tu combles mon âme !  
Je verrai ma patrie, ses heureux habitants,  
Par tes soins généreux, instruits et clairvoyants ;  
Je les verrai levant leurs mains reconnaissantes,  
Adresser au Très-Haut des prières ardentes  
Pour l'insigne mortel qui fera leur bonheur,  
En lui donnant le titre de Libérateur.  
Je joindrai mes accens aux cris de l'allégresse,  
Et ma bouche partout publiera sa sagesse."

## APPENDICE

PIERRE ROUBAUD

Voilà un nom qui, d'après les recherches récentes de MM. Parkman, Verreau et Brymner, aurait acquis dans notre sombre passé une notoriété encore plus sombre.

L'historien Parkman, d'après des lettres de Vaudreuil, mentionne que Montcalm aurait peut-être confié au missionnaire Roubaud des documents dont ce dernier, s'il ne les brûla pas, aurait fait un fort mauvais usage. Ces lettres ont pu devenir le canevas de la célèbre brochure, publiée en langues anglaise et française, à Londres, en 1777, par J. Almon, et intitulée : *Lettres de monsieur le marquis de Montcalm, gouverneur général en Canada, à messieurs de Berryer et de Molé, écrites dans les années 1757, 1758 et 1759, avec une version anglaise*. Ces lettres offrent des indices très certains qu'elles ont été fabriquées pour influencer l'opinion publique sur la conduite des colonies anglaises alors en révolte. La principale, la fameuse lettre prophétique de Montcalm, est celle qu'il adressa au président de Molé, et datée de Québec, le 24 août 1759. M. Parkman, dans un savant mémoire, soumis en 1769 à la *Société Historique du Massachusetts*, pp. 112, 128 — que j'ai par devers moi — a fait valoir ses raisons pour en venir à cette conclusion ; et, comme aucun vaisseau français ne put retourner de Québec en France, à partir de la fin du printemps de 1759 jusqu'aux derniers jours de novembre, époque où le capitaine Kannon, de la marine française, parvint à éviter les batteries de Québec, et à porter en France des nouvelles de la colonie, quelques-unes des lettres dont il était le porteur avaient dû être écrites un mois avant son départ.

M. Parkman, tout en rendant un témoignage mérité aux connaissances historiques de notre collègue, M. l'abbé Verreau, ajoute que ce dernier, après avoir comparé les écritures, s'était convaincu que ces prétendues lettres de Montcalm avaient été fabriquées par Roubaud<sup>1</sup>.

En 1777, l'authenticité de cette lettre de Montcalm fut niée en plein parlement par lord Shelburne, habile homme d'Etat, et ancêtre de notre présent gouverneur, lord Lansdowne. L'authenticité en fut maintenue par le célèbre lord Mansfield ; Carlyle en cite un passage dans ses œuvres ; où l'avait-il pris ?

Voyons le *Rapport du département de l'Agriculture pour 1874*, page 183, verbo "Archive", à propos d'un "projet de former une armée de sauvages pour détruire les colonies anglaises." M. l'abbé Verreau écrit ceci : "Ce mémoire est attribué à Montcalm. Il est précédé d'une préface qui explique comment le général français a formé ce plan. Il est suivi de la dernière des lettres attribuées à Montcalm et publiées à Londres en 1777."

Le mémoire est absurde, mais la lettre très bien écrite. Elle est accompagnée d'une note, où l'on affirme que le bagage de Montcalm, déposé à Saint-François-du-Lac, fut brûlé pour l'empêcher de tomber aux mains des ennemis. Cette affirmation, et surtout l'écriture du manuscrit, ne me laissent aucun doute sur la personnalité de celui qui l'a composé. Roubaud, dont l'esprit était aussi inquiet que fécond, s'était mis au service d'Amherst, aussitôt après la conquête, lui offrant tantôt de lui indiquer des mines importantes que le gouvernement français avait tenues cachées, tantôt de lui communiquer des papiers de Montcalm. Suivant les besoins du moment, il cherchait à déprécier cet illustre mort ou à faire son éloge. Il possédait, disait-il, le code que Montcalm avait préparé pour le Canada ; malheureusement, l'humidité avait effacé une partie de l'écriture. Il l'accuse formellement d'avoir livré les prisonniers anglais à la cruauté des sauvages, après la prise du fort George, où, sans l'intervention de Roubaud, ils auraient tous été massacrés. Aussi réclama-t-il, plus tard, une forte somme comme indemnité. Le *British Museum* a, sur ce sujet, deux mémoires imprimés qui me paraissent avoir été présentés au roi par Roubaud. Dans un de ses nombreux placets, il affirme positivement avoir offert à George III "une copie des prétendues lettres de Montcalm, qui sont plutôt des dissertations politiques sur la constitution anglaise... La seconde copie de ces lettres fut donnée à M. George Grinville, et ensuite communiquée à lord Chatham." Il écrivait ceci en 1771, et il était assez facile de prévoir des événements qui commençaient déjà à se produire. Dès 1767, Carleton en avait le pressentiment, et conseillait au gouvernement anglais de se tenir sur ses gardes.

Quoi qu'il en soit, ces lettres me paraissent l'œuvre de Roubaud, et forment partie des quatre-vingt dix-huit mémoires, placets et renseignements sur le Canada distribués par lui au roi, à ses ministres et aux gouverneurs, sans compter plusieurs dissertations sur des affaires étrangères à notre pays. Je crois qu'il est aussi l'auteur des *Lettres politiques et systématiques de M. le maréchal de Belisle à M. le marquis de Montcalm, pour le rétablissement de la marine française*, dont le manuscrit forme partie de la précieuse collection du marquis de Lansdowne. (*Rapport du ministre de l'Agriculture du Canada* — archives 1874 — p. 183.)

<sup>1</sup> *Montcalm and Wolfe*, Parkman, t. II, p. 326.

## L'EX-JÉSUITE ROUBAUD

(Extrait du Rapport de l'archiviste D. Brymner, 1885.)

Pierre-Antoine Roubaud naquit à Avignon, France ; sa mère était calviniste, et tous ses frères et sœurs furent élevés dans ce culte. Lui se fit catholique, entra dans les ordres, et vint au Canada en juin 1742.

Il fut chargé de la mission abénaquise de Saint-François-du-Lac, et suivit les Peaux-Rouges, comme leur chapelain, durant la campagne de 1757, sous Montcalm. Présent à l'affreux massacre du fort George, il réclama dans une lettre le mérite d'avoir arraché à ces barbares plusieurs prisonniers anglais, et notamment un jeune enfant, au moment où l'on se disposait à le faire bouillir vif dans une grande chaudière.

En 1762, Roubaud était encore à Saint-François-du-Lac, malgré les ordres de ses supérieurs. Il vint cette année aux Trois-Rivières, et obtint du gouverneur Haldimand la permission d'accompagner un parti d'Indiens à la recherche d'une mine d'or qu'il disait exister aux environs. A la suite d'une perquisition infructueuse, Roubaud retourna aux Trois-Rivières, ses habits en lambeaux, dénué de tout ; on lui procura une soutane et autres habits indispensables. Haldimand, désireux de le retenir loin de sa mission, qu'il scandalisait par son train de vie, lui assigna comme occupation la préparation d'un code de lois françaises pour le Canada : tâche qu'il mit bientôt de côté ; puis il réclama de l'aide une seconde fois.

Bientôt il passa le temps en voyages de Saint-François-du-Lac aux Trois-Rivières, au grand déplaisir de Haldimand. Enfin il arriva aux Trois-Rivières, frappé d'un mal *affreux*, refusa l'asile qu'on lui offrit à l'hôpital desservi par des religieuses, et s'aventura dans son canot d'écorce, en route pour Québec, espérant, disait-il, s'y faire arrêter comme prisonnier politique et y acquérir de la notoriété. Le général Murray, à la demande des jésuites de Québec, voulut le renvoyer à Haldimand, pour qu'il l'expédiât à sa mission, mais le gouverneur des Trois-Rivières, fatigué de ses obsessions constantes, écrivit le 24 octobre 1762 au général Murray, de le placer sous la garde des jésuites, à Québec, ajoutant que Roubaud était un homme sans foi ni honneur, qui lui avait causé plus d'ennuis que la moitié de son gouvernement, et que les jésuites étaient ceux qui devraient surveiller leur confrère et prévenir de nouveaux scandales de sa part.

Le gouverneur Murray, plus tard, se laissa gagner par Roubaud, le fit sortir de la maison des jésuites, et loger sous son toit. Roubaud dit alors adieu à l'ordre, abjura sa foi, et prêta le serment requis : ce qui, à ce qu'il prétendit, lui valut une amère persécution. Roubaud ajoute que, pour échapper à la vindicte de l'ordre, il accepta la mission que le général Murray lui confia, et s'embarqua pour Londres, afin de hâter le règlement de la réclamation que l'Angleterre avait contre la France, au sujet du papier-monnaie de la colonie, réclamation que la France refusait de reconnaître. Roubaud prétend que, grâce à ses démarches, le règlement de cette affaire valut £1,000,000 sterling à l'Angleterre, et ne lui rapporta que de faibles bénéfices.

Le R. P. Glapion, supérieur des jésuites, prétend au contraire que Roubaud fut envoyé à Londres, parce que la vie licencieuse qu'il continuait de mener dans sa mission exigeait son prompt départ, tant pour le bien de la mission que pour l'honneur de l'ordre.

Où Roubaud n'avait pas abjuré, quand il devint le commensal de Murray, ou sa conversion fut tenue secrète. A son arrivée à Londres, il devait se mettre sous la direction du général des jésuites. Le P. Glapion, à la suite d'une entrevue avec Murray, conclut un arrangement avec Roubaud, comme suit :

Les jésuites seraient tenus :

- 1o De solder le coût de sa traversée de Québec à Londres ;
- 2o De le vêtir convenablement en habits laïques ;
- 3o De lui fournir l'argent et les provisions nécessaires pour le voyage ;
- 4o De lui faire tenir, à dater de son arrivée en Angleterre, une somme de dix guinées par mois, durant cinq mois ;

- 5o De payer ses frais de voyage de Londres à Rome, dès que le général de l'ordre le manderait.

On avait fixé cinq mois de durée pour la pension, pour donner le temps d'arriver aux nouvelles de Rome, en réponse à ses lettres.

La pension, cependant, à la demande expresse du général Murray, se continua une année entière. Roubaud, pendant son séjour à Londres, ne changea pas son train de vie. Sous le prétexte de sa prétendue réclamation contre les jésuites, il fit des emprunts pour solder ses nombreuses dettes, et peu de temps après, il envoya une lettre menaçante au général, réclamant sa part dans leurs biens, comme de droit. Pendant un certain temps, il disait faire partie de l'ordre ; mais, bientôt il employa toutes les sommes qu'il en retirait au soutien d'une femme qu'il avait ramassée dans la rue, et qui, peu à peu, descendit au dernier degré de la dépravation, comme il l'avoue lui-même.

Bientôt il se fit comédien, et remplit des rôles à l'opéra de Londres, comme suprême ressource contre l'indigence.

Il sut néanmoins, malgré ses désordres, garder quelque crédit à la Cour, et fit de l'opposition au successeur de Mgr Montgolfier, M. Briand, quand celui-ci alla demander à Londres l'autorisation du gouvernement britannique pour se faire consacrer évêque en France. Roubaud suscita mille tracasseries aux jésuites, et en imposa à lord Shelburne, au point que ce dernier recommanda au gouverneur Carleton un placet que Roubaud avait présenté, réclamant une pension pour services rendus. La misère le rendit ingénieux et hardi. Tantôt on le trouve secrétaire d'ambassade en Hollande, tantôt préparant les mercuriales de Du Calvet et ses dossiers, pour les tribunaux de Londres, contre le général Haldimand. En 1783, il sut se concilier les bonnes grâces des deux délégués de la colonie, MM. Adhemar et Delile.

Il trahissait son ami Du Calvet d'abord, en lui dérobant sa correspondance privée, et trahissait plus tard Adhemar. Il se faisait leur délateur auprès de Haldimand. On perd toute trace de ce misérable vers 1787. Il mourut probablement à Londres ou à Paris. "C'était un génie, dit sir Guy Carleton, un habile écrivain, doué d'une imagination rare; mais un caractère fourbe, sans une parcelle d'honneur ou de probité." Il existe deux documents aux archives du séminaire de Québec portant sa signature.

VII — *Trois mois à Londres, — Souvenirs de l'Exposition coloniale, — Fragments, —*

*Par* JOSEPH MARMETTE.

( Lu le 26 mai 1888. )

Le 24 avril 1886, je m'embarquais à Halifax pour me rendre à Londres, où j'avais mission pour installer la bibliothèque d'ouvrages canadiens que notre gouvernement fédéral avait décidé d'envoyer à l'Exposition coloniale. J'allais y remplacer temporairement M. De Celles, bibliothécaire du parlement, qui se trouvait empêché, pour le moment, de s'absenter du pays. . . .

Je caressais l'espoir d'être rendu à temps pour assister à l'ouverture solennelle de l'Exposition, qui devait avoir lieu le 4 mai ; mais les vents contraires, la mer constamment en furie, et, pour surcroît d'ennui, une brume épaisse qui nous enveloppa sur la mer d'Irlande et nous retarda encore de douze heures, furent cause que nous ne touchâmes Liverpool que le 4 mai, vers les six heures du soir.

Le lendemain, je prenais le premier train rapide pour Londres. Ravissant, ce voyage de quatre heures à travers la campagne anglaise, où ce n'est partout qu'une succession de prés et de bosquets verdoyants : parc immense et splendide où d'innombrables troupeaux de bœufs et de moutons de la plus belle race paissent sur un moelleux tapis d'herbe grasse où ils enfoncent jusqu'au genou. Çà et là, des villes manufacturières, aux usines enfumées, dont les hautes cheminées défilent dans un gigantesque et vertigineux tourbillonnement. Et puis, à nos pieds, dans le creux des vallons, apparaissent, non loin d'un château arrogamment perché sur la hauteur, de pauvres chaumières qui nous rappellent que toute cette belle et riche contrée appartient à un tout petit nombre de grands propriétaires, dont les habitants de ces chaumières ne sont que les fermiers besogneux auxquels la possession du sol est toujours restée défendue.

Rendu à Londres vers les trois heures de l'après-midi, je me dirigeai, au saut du train, vers l'agence du gouvernement canadien, à deux pas de l'abbaye de Westminster. En mettant le pied sur le seuil de l'agence, je tombai dans les bras de mon ami, M. Fabre, attaché comme commissaire canadien à l'Exposition coloniale. Sa femme et son fils étant restés à Paris, d'où ils ne devaient venir le rejoindre qu'une quinzaine de jours plus tard, et lui se trouvant seul à Londres depuis deux semaines, il parut me revoir avec plaisir et me fit descendre à son hôtel, le Rawlings, situé sur Germeyn street, à deux minutes de Regent circus, qui est l'endroit où la vie de Londres est le plus animée.

Quand j'eus secoué la poussière du voyage, nous allâmes tous deux, M. Fabre et moi, dîner au restaurant Royal, sur Regent circus ; c'est le meilleur restaurant français de Londres. Oh ! l'agréable repas en la compagnie du plus aimable convive que je connaisse ! Servi par une nature des plus affinées, et par un tempérament de Parisien, son esprit, toujours en fête, pétillait surtout à table, et tire alors des feux d'artifice à jets continus.

Aussi, combien jouissais-je en l'écoutant me mettre au courant des mille et un curieux détails de l'Exposition où j'allais passer trois mois dans l'intimité la plus complète avec lui ! Et puis, je le lançai sur la pente des nouvelles littéraires de Paris, son terrain de prédilection. Il fut étincelant de verve. Moi, tout réconforté, après dix jours pénibles de mer, tenu sous le charme, je me délectais à l'écouter. Que loin de moi étaient déjà l'Océan avec toutes ses misères !

Quand nous sortîmes du restaurant, la nuit sereine régnait sur la grande ville. Autant le jour est souvent terne, enfumé, autant les nuits sont généralement claires, étoilées à Londres. Avec les feux de ses cent mille usines, qui s'éteignent à la tombée du jour, se dissipe aussi le brouillard opaque de fumée qui plane sur la cité monstre, l'enveloppe, la pénètre et lui voile souvent tout à fait la clarté du soleil ; à tel point qu'il y faut alors allumer le gaz en plein midi.

Je m'en allais heureux de vivre, et mon esprit en gaieté se grisait de tout le mouvement qui se faisait autour de nous dans ce quartier si élégamment animé. Comme je me sentais loin de la maussade et insipide petite ville d'Ottawa, où je me sens toujours aussi exilé qu'Ovide à Thomes, au barbare pays des Gètes !

Un détail que je n'avais pas encore remarqué, lors de mes deux précédents voyages, me frappa vivement : à chaque coin de rue, se faisait entendre un concert d'instruments et de voix qui gaiement montait dans la nuit. Dans chacun des groupes de ces musiciens ambulants que la foule entourait, une voix d'homme chantait accompagnée par un violon qui suivait la mélodie, tandis que le rire aigu d'un fifre s'entrelaçait dans les accords saccadés d'une guitare ou d'une harpe.

— Je n'aurais pas cru les Anglais si mélomanes, dis-je à M. Fabre. Jamais, lors de mes quatre passages antérieurs à Londres, je n'y ai entendu autant de musique en plein air. On se croirait plutôt dans les rues de Naples que sur les bords de la Tamise. Que veut donc dire cette frénésie musicale, pour moi si nouvelle en cet endroit ?

— Eh ! cher ami, c'est le *May day* qui se prolonge.

— Et qu'est-ce que le *May day* ?

C'est le premier jour de mai, c'est le renouveau, c'est le retour de la saison des fleurs et du soleil, que les peuples ont célébrés dans les temps les plus reculés. Rien de plus naturel que cette gaie transition du sombre et froid hiver au printemps tiède et vivifiant, ait, de tout temps, fait éclater en joyeuses manifestations le sentiment de bien-être que ressentent les hommes à ce regain de jeunesse de la nature et des êtres animés.

Au XVI<sup>e</sup> siècle, en Angleterre, c'était encore l'usage à la campagne, dans la classe moyenne et parmi le peuple, de sortir au petit matin pour aller faire provision de fleurs et de feuillage que l'on rapportait avec de grandes démonstrations de joie, au son des cors et des tambourins. Rameaux et fleurs servaient à décorer les portes et les fenêtres de chacune des maisons du village, dont la plus belle fille était ensuite couronnée comme "Reine de mai." Les gentilshommes et les nobles dames ne dédaignaient pas de prendre part à la fête, et l'on vit même des rois et des reines se mêler alors à la foule de leurs sujets en liesse.

C'était aussi la coutume, dans les villages comme dans les villes, de planter, au milieu de la place publique, un mai tout enguirlandé de fleurs, autour duquel on dansait.

La même fête se célébrait en France, et nos aïeux l'apportèrent au Canada où l'usage du mai planté à la porte du colonel ou du capitaine de milice de la paroisse a subsisté



jusque dans la première moitié de ce siècle. Chez nous, aussi bien qu'en France, c'était une occasion de réjouissance et de ripaille, comme le témoigne cette vieille chanson qu'il me souvient avoir entendu chanter dans mon enfance :

Le premier jour de mai,  
 Labouré,  
 Quand fut fait' la semaille,  
 J'm'en fus planter un mai,  
 Labouré,  
 D'avant la porte à Jean Braille.  
 Oui, j't'en goûte  
 D'la rigoute  
 Oh ya !  
 Oui, j't'en goûte d'la rigaille !

Quand le mai fut planté,  
 Labouré,  
 Dans la maison j'entraille ;  
 Trouvant le couvert mis,  
 Labouris,  
 Sans façon j'm'approchaille.  
 Oui, j't'en goûte, etc.

... Tour à tour j'fais passer,  
 Labouré,  
 Dindons, fricots d'volailles...

Il faut croire que notre convive, mis en appétit par la plantation du mai et les danses rondes, y allait un peu goulûment, car le maître de la maison s'écrie tout à coup :

C'tassez, m'dit-y, gourmand,  
 Labourant,  
 Y'a assez longtemps qu'tu tailles !

Ce à quoi l'insatiable et peu susceptible mangeur répond en riant, et la bouche encore pleine :

Je ne suis pas gourmand,  
 Labourant,  
 Je soulag' mes entrailles !...

A Londres, de nos jours, les manifestations bruyantes en l'honneur du renouveau ne sont plus que l'apanage des ramoneurs. Ils s'en vont par groupes de trois ou quatre, attifés de vêtements carnavalesques. L'un d'eux, qu'on appelle "Jack in the Green," est enveloppé dans une gerbe de feuillage et de fleurs que couronne le drapeau anglais. Ces bizarres personnages s'arrêtent dans les carrefours, au coin des rues les plus fréquentées, et y dansent au son du violon, du fifre et du tambour, récoltant la moisson de piécettes que le passant laisse tomber dans leur sébile.

Je me suis facilement laissé entraîner à décrire ce trait de mœurs tout particulier à la ville de Londres, parce qu'il rappelle les coutumes charmantes du temps passé.



Le lendemain, pour me rapprocher de l'Exposition, je me logeais dans une pension bourgeoise de Brompton Square, sur Brompton road, qui continue la rue Picadilly en gagnant l'extrémité ouest de Londres. J'y étais à cinq minutes de marche de l'Exposition, que l'on avait très heureusement installée dans les spacieux jardins de l'Horticultural Society, à côté du musée de South Kensington et de l'Albert Hall, au milieu de massifs de verdure et de fleurs, de fontaines et de jets d'eau rafraîchissants.

Je m'y rendis avec M. Fabre qui m'apprit à m'y reconnaître dans ce dédale de galeries encombrées des produits innombrables de toutes les colonies de la Grande-Bretagne. Mes livres n'étant pas encore arrivés, je passai les deux ou trois premiers jours à me promener — sans crainte du mal de mer, cette fois — d'un pays à l'autre : des Indes en Australie, de la Chine à la Nouvelle-Zélande, de Malte au cap de Bonne-Espérance, de la Nouvelle-Galles du Sud au Canada.

Quelle immense variété dans les productions du sol et dans l'industrie de tant de pays si différents et si éloignés les uns des autres ! Quoique je n'aie certes pas l'intention de faire entrer dans le cadre de ces souvenirs une étude agronomique ou industrielle sur les nombreuses colonies anglaises, je crois, cependant, qu'il paraîtra intéressant de jeter un coup d'œil rapide sur l'ensemble des principaux produits particuliers à ces diverses colonies.

Dans cette longue galerie aux arcades pittoresques — moitié plein cintre, moitié ogivales — et dont les montants et les arceaux capricieux, en bois de tick ou de santal, sont sculptés, ciselés, fouillés à jour avec un art infini, s'étalent les objets d'art, les armes et les riches soieries de l'Inde : vases d'or et d'argent massifs, aux formes étranges, aux fines ciselures dessinant des figures bizarres d'hommes ou d'animaux ; aiguères, coupes, coffrets merveilleux, au repoussé ou ciselés avec un goût, une patience extrêmes ; épées, dagues, poignards, fusils et pistolets damasquinés, aux incrustations d'or et d'argent si finement déliées ; bijoux ruisselants de diamants, de rubis, d'émeraudes, de saphirs ou de perles fines ; ivoires découpés comme les plus légères dentelles ; brocards tissus d'or, d'argent et de soie, aux reflets chatoyants comme le plumage des oiseaux des tropiques.

Les yeux encore éblouis par toutes ces richesses du luxe oriental, nous arrivons au palais indien, qui se dresse avec ses balcons aux sveltes colonnettes, ses tentures somptueuses et ses lourdes portières de damas d'orient. Sa cour à colonnades est peuplée d'artisans indigènes : orfèvres, bijoutiers, ciseleurs sur métal, sur ivoire et sur bois, sculpteurs, tisserands ou potiers. Il me semble encore entendre la psalmodie étrange de deux petits Indiens travaillant à une tapisserie sous la direction d'un gros homme bronzé qui pouvait être leur père. Tous les matins, vers les neuf heures, alors que les visiteurs n'étaient pas encore admis, ces trois travailleurs chantaient comme une longue litanie. Tour à tour, les deux garçonnets criaient rapidement, sur le ton le plus élevé de la gamme et en deux notes seulement, une suite de mots gutturaux ; et, de temps à autre, la voix basse du vieux leur répondait par deux ou trois sons qu'il tirait des profondeurs de son énorme corps. Était-ce une prière, un chant sacré ou profane ? Personne ne me l'a jamais pu dire ; mais, cette déclamation aiguë, entrecoupée de mugissements de basse profonde, me poursuit encore et m'est restée dans l'oreille comme la mélopée la plus étrange qui se puisse entendre.

Nous passons à Chypre, qui se pare de ses dentelles et de ses soieries. Sur les drapeaux qui flottent au-dessus de cette cour, sont brodés des dessins qui rappellent les souvenirs du royaume des Cypriotes, et datent de 800 à 500 ans avant Jésus-Christ. Ces dessins, copiés d'après ceux qui ornaient les drapeaux des Ptolémée, des Génois, de la dynastie des Lusignan, et, plus tard, les étendards turcs et anglais, indiquent les différentes époques de l'histoire de l'île de Chypre.

Voici Ceylan, l'île merveilleuse, aimée du soleil, avec ses pierres précieuses, ses perles renommées, ses bijoux en filigrane d'or de Jaffna, ses vases d'argent au repoussé, ses dentelles, ses mignons coffrets d'ivoire ou d'ébène et ses potiches de kandie.

Défilent ensuite les bois précieux de l'île Maurice, ses plumes d'autruche aux brillantes couleurs, ses épices et ses plantes médicinales, ainsi que les meubles de bois noir, les cordages et les produits pharmaceutiques de Hong-Kong.

Laissant les Indes et la Chine en arrière, nous prenons pied en Australie, qui exhibe fièrement ses échantillons d'or et d'argent, ses bois précieux, ses perles, ses vins un peu capiteux, et ses laines soyeuses.

Ici, les Antilles nous montrent leurs produits tropicaux : tabacs, cafés, liqueurs, coquillages, perles et coraux ; le Honduras ses bois, ses fruits, ses potiches préhistoriques et ses curiosités astèques. Là, le Cap fait étinceler ses diamants, ses pierres précieuses, et semble non moins fier de ses peaux brutes et de ses cuirs, tandis que la Côte-d'Or nous dit son nom par le scintillement de ses bijoux.

Avant de traverser en Amérique, abordons un instant à Sainte-Hélène pour y rêver en face d'un moulage en plâtre de la figure de Napoléon, pris par le capitaine Rubidge, immédiatement après la mort du grand empereur.

Enfin, nous voici bien chez nous, dans notre Canada, qui par la nature solide, la qualité supérieure et l'abondance de ses produits agricoles et industriels, attire le plus l'attention des visiteurs sérieux.

Le trophée agricole, élevé au bout de la plus longue galerie de la section canadienne, tire l'œil du visiteur autant par l'élégance de ses lignes que par l'originalité des matériaux variés de cet arc triomphal composé de tous les produits de l'agriculture et de l'horticulture de la confédération canadienne. Les quatre piliers, formés de bocaux superposés contenant d'appétissants échantillons de tous nos fruits, pommes, poires, pêches, etc., reposent sur un socle de barils et de sacs de grains de toutes espèces. Des festons de paille, de tiges et de longues feuilles de maïs, enjolivent la portée des arceaux tandis que des lames de faux entrecroisées jettent le fauve éclair de leur acier poli sur le chapiteau des colonnes. Sur l'entablement de cette première tour reposent des instruments aratoires, des barils de cidre, etc., servant de fondations à une seconde tour aux proportions réduites. Des conserves de viandes et de fruits, en boîtes et en bocaux, à côté desquels s'entrelacent gracieusement des épis de blé et les longues herbes des prairies du Nord-Ouest, constituent les piliers de la seconde arcade qui se couronne au centre par de sveltes gerbes de blé s'élançant en panache au sommet aminci du trophée.

Viennent ensuite les nombreux échantillons de nos bois et des travaux d'ébénisterie qui composent l'ameublement. Les pianos canadiens étonnent surtout les Londoniens autant par la qualité supérieure du son que par la richesse et le fini de leur bois. La perfection du mécanisme, le moelleux et la sonorité de ces instruments leur valurent le

diplôme le plus flatteur du grand musicien Franz Liszt, qui devait s'éteindre quelques mois plus tard, chargé de gloire et d'années.

Le trophée de chasse, où figurent si avantageusement nos fauves et nos fourrures, est le centre d'attraction des visiteurs ; et nous y voyons tour à tour s'arrêter la reine Victoria, la malheureuse impératrice Eugénie, à qui l'infortune n'a plus laissé qu'une couronne de cheveux blancs, la gracieuse princesse Louise, et toute une légion de grandes dames de Londres.

Ici, nos étoffes, ainsi qu'une collection minéralogique très complète, font s'approcher l'industriel et le savant.

Plus loin, dans la bruyante galerie des machines, où d'immenses roues font s'agiter, comme des crustacés monstres ou d'énormes araignées, nos instruments d'agriculture si perfectionnés aujourd'hui, se pressent surtout les paysans des environs de Londres qui, chaque jour, accourent par milliers à l'Exposition. En contemplant les grands bras des moissonneuses, les longues dents tranchantes des faucheuses mécaniques, qui se meuvent automatiquement et représentent chacune le travail de quarante hommes peinant à la fois, ces braves gens sont ébahis de voir une civilisation toute jeune encore apporter au vieux monde un aussi parfait outillage.

Non moins encombrée de curieux est la section voisine, installée de manière à donner une excellente idée de l'instruction publique au Canada. Chaque province y rivalise à se montrer la plus avancée dans l'enseignement ; mais, dans tout ce déploiement de cartes géographiques, d'instruments de physique ou de chimie, de dessins, de cahiers des élèves, Québec et Ontario brillent entre toutes les provinces sœurs de la Confédération ; tandis que la bibliothèque de 2,000 volumes d'histoire, de science et de littérature canadiennes, est la seule exhibée à cette Exposition de toutes les colonies anglaises.

Somme toute, l'exposition canadienne primait les autres et faisait le plus grand honneur au marquis de Lorne et à sir Charles Tupper, notre si digne et si sympathique haut-commissaire à Londres. Pour avoir une idée de l'activité, de l'intelligence et de la souplesse de caractère déployées en cette occasion solennelle par le représentant du Canada en Angleterre, il faut avoir vu, comme nous, sir Charles à l'œuvre durant plus de trois mois, sur pied du matin jusqu'à la nuit, toujours affairé, dirigeant tout et ne négligeant pas le plus mince détail qui fût de nature à profiter à chacun des nombreux exposants, et à faire mieux ressortir l'ensemble de cette colossale organisation.

Les bureaux de direction, destinés à chaque colonie, se trouvaient réunis dans un endroit pittoresque désigné sous le nom attrayant de "Old London," et qui représente une rue du vieux Londres reconstruite dans toute l'intégrité de son cachet moyen âge. Avec ces étroites maisons à toit pointu, aux façades sculptées, sur lesquelles s'entrelacent des poutres faisant saillie au-dessus de balcons projetés en avant et s'arc-boutant entre des fenêtres dont les carreaux de couleur sont taillés en losanges et encadrés dans de minces châssis de plomb, cette ruelle étrange, d'une largeur de vingt pieds à peine, offre à l'œil rêveur l'aspect le plus intéressant. Un beffroi, tout peuplé de cloches aux voix graves, y chantait les heures avec des vibrations mélancoliques, ainsi que "l'air du prince de Galles," qui tombaient tristes sur nous, comme les sanglots des trépassés, jadis — il y a des siècles — habitants de ce coin pieusement reproduit de la vieille cité. Comme elles nous faisaient remonter loin le passé ces mêmes cloches qui appelèrent pour la première fois les fidèles à la prière à l'abbaye de Glastonbury, en 1335, avant que la bataille de Crécy n'eût encore mis

en usage la poudre à canon qui allait bouleverser l'art cruel de la guerre et donner aux hommes un nouvel et terrible moyen de s'entre-détruire.

Tel était, durant la journée, l'aspect général de l'Exposition, avec en sus le fourmillement de 60 à 80,000 personnes qui, chaque jour, l'envahissaient et puis se répandaient dans les jardins spacieux qui règnent entre les galeries et l'Albert Hall, vaste salle de concert où 15,000 auditeurs tiennent à l'aise. Le soir, quand la lumière électrique poudroyait de ses fulgurantes clartés les galeries resplendissantes d'articles de luxe de toutes sortes, d'étoffes les plus riches, d'objets d'art les plus précieux ; lorsque, dans les vastes jardins, neuf mille sept cents lampes électriques multicolores éclataient comme une rivière de pierres précieuses sur le front de la nuit, et rayonnaient sur les dentelures mauresques des kiosques, à travers les jaillissements diamantés des fontaines, en s'épandant sur le flot mouvant des quelque cinquantes mille personnes qui peuplaient les allées ; lorsque, enfin, l'oreille était charmée par d'excellente musique dissimulée dans des massifs de verdure, l'on se croyait transporté dans le pays des songes, emporté, comme Sindbad le Marin, sur les ailes de la fantaisie, à travers les pays enchantés des Mille et une nuits.

\* \* \*

Le samedi, 8 mai, l'on donnait à l'Albert Hall le premier grand concert de la saison. Ce qu'on appelle la *season* à Londres dure depuis le 1er mai jusqu'à la fin de juillet. C'est le temps où le poulx de la capitale bat son plein : le temps des courses, des concerts, de l'opéra, des bals, des grands dîners, des fêtes de toutes sortes. Au mois d'août, le beau monde, la *gentry* prend sa volée pour aller s'ébattre dans les châteaux et dans la si verte campagne anglaise où elle se livre, sur les pelouses veloutées, aux jeux fashionnables du *lawn tennis* et du *croquet*, jusqu'à ce que, la moisson étant terminée, la chasse à courre offre aux cavaliers consommés, ainsi qu'aux hardies amazones, une magnifique occasion de s'enfoncer quelque côte ou de se casser un membre à la poursuite d'un pauvre renard fuyant affolé à travers les champs jauniss.

Mmes Albani et Nilsson devant chanter à ce concert du 8 mai, je n'eus garde — dilettante enragé que je suis — de manquer d'assister à cette fête des nerfs auditifs. A trois heures, la vaste salle de l'Albert Hall contenait ses quinze mille auditeurs.

Un orchestre puissant, très bien composé, que son chef enlevait vaillamment, exécuta la belle ouverture du *Freyschutz* de Weber. J'avais entendu déjà trop de bonne, d'excellente musique à Paris pour être empoigné par l'orchestre de l'Albert Hall, si bon qu'il fût. Du reste, il m'a paru que les musiciens anglais manquent un peu de chaleur dans l'interprétation. Ils rendent, selon moi, les andantes avec trop de langueur, et ne savent pas mettre le brio, la maestria des Latins, dans le mouvement plus vif de l'allegretto, dans le rendu de la progression ascendante ou descendante du *rinforzando* et du *diminuendo*. Leur musique est correcte, mais elle manque de cette fougue, de cette passion qui se communique à l'auditeur dans les concerts parisiens et fait vibrer tous ses nerfs comme les cordes d'un instrument chatouillées par l'archet.

La Nilsson se fit entendre la première. J'avouerai qu'elle me désappointa un peu. Soit qu'elle fût fatiguée, soit que sa voix n'ait jamais été plus forte, elle paraissait visiblement lutter contre l'immensité, la sonorité rebelle de la salle. J'avais décidément entendu

d'aussi bonnes cantatrices à Paris, entre autres Mmes Devriès, Richard et Krauss, au grand Opéra.

Enfin, l'Albani lança, dans les ondes plus sonores pour elle de la salle, les premières notes du grand air de *Lucie de Lamermoor*. On aurait, par l'énorme enceinte, entendu glisser dans l'air une plume d'oiseau-mouche. D'un volume plus ample que celle de la Nilsson, la voix de l'Albani n'en a pas moins la pureté cristalline de lamelles de verre. Et quelle souplesse dans les vocalises, quel art dans les nuances, quelle chaleur contagieuse, quelle inspiration dans l'interprétation de l'œuvre des grands compositeurs ! Il y eut un moment où, l'orchestre soupirant en sourdine, la flûte éleva la voix pour suivre d'abord, et comme pour provoquer ensuite, la prima donna à un combat singulier. L'instrument, l'accompagnant en tierce, semblait, à l'andante, défier la chanteuse pour la pureté des sons émis. Mais la voix de la cantatrice se balançait mollement dans l'espace comme ces grands oiseaux qui arrêtent le battement de leurs ailes et n'en continuent pas moins de fendre l'air avec la plus gracieuse aisance. Dépitée de se voir vaincue par la pureté des notes les plus longuement soutenues, la flûte se lança sur la pente étourdissante des trilles, des roulades familières aux rossignols européens, ces virtuoses fantaisistes des bocages recueillis dans le silence des nuits d'été. Sans plus d'effort, la voix de l'Albani se prit à se jouer à travers les dentelures de sons de l'instrument, faisant entre elles les plus fines ciselures, décrivant les arabesques les plus capricieuses, les plus délicatement et les plus correctement dessinées qui se puissent admirer. Stupéfiée se tut la flûte, et la voix triomphante monta crescendo et se tint longtemps suspendue tout en haut, remonta encore d'un dernier coup d'aile pour aller decrescendo s'évaporer dans l'infini du rêve.

J'aurai encore l'occasion de parler de notre célèbre compatriote, Mme Albani, et comme grande artiste et comme femme du monde accomplie.

Le samedi d'après, 15 mai, autre concert auquel prenait part le violoniste Sarrazate. C'était au St. James' Hall, salle infiniment plus petite, mais aussi plus favorable à la musique de concert. L'orchestre, entre autres choses, y exécuta les "Préludes du poème symphonique" de Liszt, et rendit ce fragment de musique savante et un peu trop bruyante, ainsi que l'ouverture magistrale du *Struense* de Meyerbeer, avec plus de brio, de bravoure que ne l'avait fait, le samedi d'avant, l'orchestre de l'Albert Hall des morceaux qu'il y avait joués. Peut-être ce meilleur effet produit était-il dû à l'acoustique excellente du St. James' Hall, où pas un son ne s'affaiblit inutilement. Ainsi, lorsque Sarrazate, le premier violoniste de ce temps, fit chanter à son divin instrument les accents suaves de l'adagio et de l'andante de la *Fantaisie écossaise* de Max Bruck, et les notes les plus langoureuses du *Chant du rossignol* — composition assez faible du virtuose lui-même — les plus vaporeuses vibrations des cordes enchantées se balançaient au-dessus de l'élégant auditoire avec la grâce du colibri faisant sa cour aux fleurs d'un parterre délicatement nuancées. Le grand artiste me tint tout le temps sous le charme, autant par la souplesse et le fini de son jeu que par l'exquise pureté des mélodies qu'il fit soupirer à son instrument, un stradivarius qui lui a coûté 2,000 louis sterling. Jolie somme pour cinq petits morceaux de bois et quatre boyaux de chat !

Le soir du 18 mai, illumination générale des jardins de l'Exposition, et musique excellente dans les kiosques. Comme je m'étais envolé au pays idéal des rêveries sur les ailes de la ravissante mélodie de Gounod : *O Balkis, reine du matin !* et que déjà il me semblait être un des personnages mystérieux de cette délicieuse légende de la reine de Saba,

apportée d'Orient par Gérard de Nerval, le doux poète, voilà qu'une exclamation générale de la foule me ramena parmi mes contemporains. C'étaient les eaux de la grande fontaine centrale qui jouaient, et sur lesquelles on dirigeait des flots de lumière électrique aux reflets changeant à chaque instant de couleur. La gerbe d'eau du grand cercle extérieur forma d'abord comme un lys au calice énorme, tandis que, pétale gigantesque, le jet central s'élançait à cent cinquante pieds en l'air, comme une fusée qui s'éteignait soudain pour resplendir l'instant d'après et rebondir de nouveau dans la nuit. D'abord diamantés, ces jaillissements des fontaines prirent une teinte d'ambre qui devint or fauve ; et puis, ils se firent vert tendre pour se parer des tons plus graves de l'émeraude et pour passer encore par des teintes bleu pâle et azur foncé. Enfin, cette transparente masse, toujours bondissante, s'embrasa et parut être de la fonte ardente dont le rouge vif descendit au violet et finit par s'endormir dans la demi-teinte langoureuse des lilas tendres.

Placidement, tout en haut, dans le ciel pur, souriaient les étoiles, elles qui, sans effort, sous le regard de Dieu qui les créa d'une pensée, éclairent notre chétive planète depuis des milliers d'années, à des cent millions de lieues !

Le 20 mai, comme je suis occupé à surveiller le déballage de mes livres, arrive le marquis de Lorne à qui je suis présenté. Il me dit être heureux de faire la connaissance de l'un des membres de sa Société Royale du Canada. Après quelques moments d'entretien au sujet des livres canadiens envoyés à l'Exposition, il me demande si j'ai vu le salon des peintures canadiennes. Je lui réponds que non. — Oh ! reprend-il, il faut voir cela, venez donc ! Et il me conduisit à l'Albert Hall, une promenade d'un quart d'heure par les galeries et les jardins.

Ce fut avec plaisir que je retrouvai des peintures canadiennes dont j'avais fait une étude dans les journaux de Montréal et de Québec, quelques semaines auparavant, et je fus heureux d'apprendre, de la bouche de lord Lorne lui-même, combien le talent de MM. Brymner, Edson, Lawson, Peel, Watson, Woodcock, etc., trouvaient d'admirateurs à Londres.

Bref, le marquis resta au moins une heure à me montrer des choses qu'il avait déjà dû voir vingt fois, et cela par pure amabilité et pour honorer l'un des membres de la société littéraire et scientifique qu'il est si fier d'avoir fondée chez nous. — Vous allez bientôt voir, me dit-il en me quittant, combien votre titre de membre de la Société Royale du Canada va vous valoir ici d'honneurs et d'invitations flatteuses.

Le lendemain, 21 mai, à midi, la reine vient visiter l'Exposition qui reste fermée au public. Il n'y a que nous, les délégués des différentes colonies. Je me place à l'entrée de notre section réservée pour la bibliothèque et l'exposition scolaire canadiennes, afin de mieux voir défilier le cortège royal. La reine vient en tête, guidée par sir Charles et lady Tupper et s'appuyant au bras du prince de Galles. Comme Sa Majesté va dépasser notre section, arrive tout à coup le marquis de Lorne qui, me désignant, dit au prince de Galles : — "Mr. Joseph Marmette, of the Royal Society of Canada." A peine ai-je fait un respectueux plongeon, que le prince de Galles se tourne vers la reine et lui décline mon nom et mon titre. Je resalue plus profondément encore et j'aperçois, en revenant à flot, la reine qui me sourit gracieusement. J'étais tout étourdi de l'honneur qui m'était fait et auquel j'avais d'autant moins droit de m'attendre qu'il avait été bien compris que, seuls, les commissaires généraux seraient présentés. Je ressentais donc déjà les effets de la bienveillante et si délicate attention du marquis de Lorne.



Le jour qui suivit, j'étais à causer, dans notre petit bureau, avec l'honorable M. Ouimet, surintendant de l'Instruction publique à Québec, lorsque le marquis de Lorne survint. Il fait avec nous un bout de causerie, part et revient l'instant d'après avec la princesse Louise, la princesse Victoria de Prusse et une autre princesse, belle à ravir, mais dont nous ne saisissons malheureusement pas le nom. Le marquis nous présente, M. Ouimet et moi, et tout ce beau monde s'asseyait dans notre modeste bureau. Nouvelle conversation de dix minutes, toujours en langue française, que la princesse Louise prononce avec l'adorable grasseyement des Parisiennes. Comme ces dames nous parlaient d'une intéressante collection d'animaux de la Nouvelle-Zélande qui avoisinait notre section, M. Ouimet, se redressant de toute sa belle stature, dit aux princesses : — "Ici, Mesdames, c'est la cage aux lions !" Ce mot les fit rire aux éclats. Avant de nous quitter, le marquis de Lorne m'invita à l'aller voir le lendemain au Kensington Palace qu'il habite ; et les princesses s'en vont, après nous avoir donné une poignée de main que nous nous étions bien gardés de leur offrir.

Le 22 mai, grande soirée chez lady Tupper. Beaucoup de beau monde, de la musique et souper à la fin, avec intermèdes de punch au champagne. J'aperçois l'Albani qui, à mon grand déplaisir, ne chante pas. Sir Charles et lady Tupper sont très empressés auprès de leurs invités, charmants pour chacun d'eux.

Le 23 mai, sur les trois heures, je me rends seul au Kensington Palace situé dans Kensington Garden, qui n'est autre chose que la continuation de Hyde Park. J'envoie ma carte par un valet de pied qui me fait traverser une longue galerie toute peuplée de bustes, de statues, de portraits, de tableaux, de vieux bahuts de grand prix, de curiosités de tout genre. Le valet jette mon nom à l'entrée d'une vaste pièce d'où le marquis vient au-devant de moi. Il me fait prendre un cigare, et le voilà parti dans une longue conversation sur le Canada qu'il aime beaucoup. Il parle aussi politique, éducation anglaise. — Votre système d'instruction publique vaut bien mieux que le nôtre, en Angleterre, me dit-il, entre autres choses.

A ce moment, on annonce le père de lord Lorne, le duc d'Argyle, un très aimable vieillard. Le marquis me demande s'il me plaît de les accompagner à l'Exposition. Je n'ai garde de refuser. Nous sortons. La sentinelle présente les armes, et nous montons en landeau. Rendu à l'Exposition, je fais les honneurs de la section canadienne aux deux illustres visiteurs. En me laissant, le marquis me dit qu'il a fait mettre mon nom sur la liste des invitations qui vont être faites par la reine, le prince de Galles et les grandes familles anglaises aux délégués des différents gouvernements coloniaux.

Le récit de ces fêtes fera le sujet de la deuxième partie de ce travail.

Si j'ai appuyé sur l'amabilité du marquis de Lorne à mon égard, veuillez bien croire, Messieurs de la Société Royale, que ce n'est point par un sentiment de vanité puérile. Bien au contraire, je suis si convaincu que toutes les attentions flatteuses dont j'ai été l'objet de la part du noble lord n'étaient adressées qu'à celui d'entre nous qu'un heureux hasard avait conduit à l'Exposition coloniale, que j'ai voulu, Messieurs et chers confrères, en faire rejaillir l'éclat sur vous tous, et vous bien marquer la haute estime en laquelle son illustre fondateur tient la Société Royale du Canada.



ROYAL SOCIETY OF CANADA.

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TRANSACTIONS

SECTION II.

ENGLISH LITERATURE, HISTORY, ARCHÆOLOGY, ETC.

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PAPERS FOR 1888.



*I—The Romance of the History of Canada.*

By JOHN TALON-LESPERANCE.

(Read May 24, 1888.)

In former papers read before the English Section of the Royal Society, I dwelt on the difficulty of writing the history of Canada, because of the peculiar circumstances attending the discovery, settlement and administration of the country. There is, perhaps, no young people, quietly plodding along and striving to keep step with the march of modern civilization, whose origin is invested with so many elements of originality as ours, and it is safe to say that, without a full knowledge and keen appreciation of these, it were hopeless for even the most skilful writer to attempt a history of the present Dominion. This remark applies in great measure to the second half of our national career, the century and a quarter since the Conquest of 1759-60; but it belongs more strikingly to the first half, from the earliest days of discovery to the capitulation of Vaudreuil. To sum up that individual character, I shall call it Romance—and hence this short paper will be taken up with some thoughts on the Romance of Canadian History.

## I.

We need not go farther back than Cartier. In his three voyages of 1534, 1535, and 1541-42—his fourth ended in naught, even if it was ever made—he descried Blanc Sablon, in Labrador; the Magdalen Islands; the Gaspé coast; then Tadoussac, Quebec and Hochelaga, and by his published reports settled the site of Verazzani's New France in the minds of his French countrymen. Everyone of Cartier's voyages would furnish a chapter for a novel. That which immediately followed, Roberval's, has afforded material for two clever Canadian dramatic poems, Martin's "Margaret" and Duvar's "De Roberval." There was a merciful stroke of Providence in the wreck of De la Roche's expedition, 1598, on Sable Island, as his ships were freighted with convicts from the gaols and galleys. Not one of these set foot in New France, the surviving twelve being carried back to their country. Two years later, in 1600, Pontgravé steps upon the scene, followed at first by a captain named Chauvin, and a gentleman named De Monts, and a little later by the Commandant of Dieppe, high in favour with Henry IV. Alongside of these men, appears the figure of Champlain, in the strength of six and thirty years, thirty more of which he was to devote to the settlement of New France. Indeed, Champlain may be called the father of Canada. In 1603, he made his first voyage, ascending the St. Lawrence to the Sault St. Louis, a little above Montreal. The next year he set sail from France, under De Monts, with Pontgravé, Poutrincourt and the historian Lescarbot, for Acadia, where a

settlement was made at Port Royal, which lasted till 1613. But Champlain, who had not favoured this diversion, withdrew before that time, and sailing for the St. Lawrence, with Pontgravé, laid the foundations of Quebec, in 1608. His career, from that date till 1635, when he died, was a series of voyages, adventures, mishaps, hardships, negotiations with the French court and French companies, wars and treaties with Indians, administrative details, and the balancing of hostile parties. Although a Catholic himself, he managed the presence of Huguenots in the colony with a measure of success.

No less successful, and more romantic, is Maisonneuve's settlement of Montreal. A soldier broken to arms, he went forth from France on a higher military expedition, which was the fruit of a vision and supernatural impulse. He carried it out with the spiritual help of Marguerite Bourgeoys and Mlle. Mance. When the Governor, De Montmagny, would dissuade him from the danger of settling in the island of Montreal, his only reply was that he would go even if all the trees there were turned into Iroquois. The solemn high mass sung on the classic tongue of land, known as Pointe-à-Callière; the carrying of the cross on his shoulders to the top of Mount Royal; the single-file sally, out of the oaken gates, on snowshoes, to meet the skulking Indian who frightened the nuns and their little wards; the forbearing stand taken against the covetousness of trappers and the greed of tradesmen rulers,—all these deeds sprang from a lofty soul, and were wrought with a dash of Christian bravery. "Maisonneuve was a great man, knightly in bearing, brave as a lion, and devout as a monk," was what I wrote of him in "Picturesque Canada," and what was repeated by M. Rousseau in his life of the founder of Villemarie, and I am proud to say it again in this presence. Maisonneuve was a lay friar, but no bigot, and ruled his mingled elements with so steady a hand that he was upbraided for it, and at length removed. He died at Paris, in a lonely cell decked with hangings and other tokens of Villemarie, and his last looks were turned toward the cross on the mountain beyond the sea.

## II.

After the romance of discovery and settlement comes that of exploration and adventure. Brilliant as are the scenes of Central and South American chivalry, in the search of unknown lands, under Ponce de Leon, Cortez and Pizarro; in her bush-rangers and *coureurs des bois*, Canada had a set of shrewd, hardy and fearless men who did much to open the vast country lying beyond the St. Lawrence and the lakes, and who, down even to our own time, have achieved wonders for the civilization of the great West. It was Champlain who discovered the Ottawa River from its mouth to Georgian Bay, and pierced to the famed and ill-starred peninsula where dwelt the Hurons, between Nottawasaga Bay and Lake Simcoe. It was he who likewise first explored the Richelieu from Sorel to the lake bearing his name, and then to Lake St. Sacrament, now called George, and Lake Ontario. The Jesuit Marquette and Joliet the trapper discovered the waters of the Mississippi down to the Arkansas; Hennepin, the Recollet, named the Falls of St. Anthony or Minnehaha; La Salle, a man of genius, explored the Father of Waters to its mouth; Nicolet made very valuable explorations in the west; Dablon and Dollier du Casson described the Niagara Falls, and the great lakes, Ontario, Erie and Huron; Drullette was the pioneer of white men in the mighty woods of Maine, and De la Verandrye

threw open to the world the resources of the great Northwest. The latter was the forerunner of that band of British men of science, engineers, army officers and gentlemen travellers who have rendered our knowledge of the Hudson Bay Territory authentic and full, and made ready the way for the revelations which Senator Schultz's Parliamentary Committee have just spread before us, of the immense Athabasca-Mackenzie valley, with its mineral, woodland and cereal wealth. As man must have in view a material object—the need of food and clothing, and the storing away of a little wallet for evil days or old age—these great travellers of the wilderness were doubtless mainly moved by the profits of barter in furs and skins, after they learned from Cartier's mistake that there were no precious metals or stones in the land. The hunt and traffic of the bear, beaver, wildcat, cariboo, ermine, fox, marten, moose, muskrat, puma, otter and wolf, were quite enough to draw the young and daring from their stockades at Quebec, Three Rivers, Villemarie and Cataragui, especially in the earlier days when the trade in peltries was open to all, and the exportation to France not controlled by powerful monopolies. But beyond this motive of gain and money-making, a lofty and romantic impulse is plainly seen in these legendary explorations, giving vent to the buoyant wants of youth and health, at sight of a new country, with its woods, plains, rivers and lakes, its fish and its game, and the inner haunts of the copper-skinned natives; while above all there was the pride of spreading the realm and reign of France over a new continent, proclaimed by cross and pillar, or stamped on leaden plates, from the days of Cartier down to 1763, when the fleur-de-lys was planted on a limestone bluff along the Mississippi, betwixt the mouths of the Ohio, Missouri and Illinois, and the name St. Louis was given to the spot, which outpost, in less than one hundred years, has become the fifth city of the United States.

### III.

The romance of missions and martyrs is perhaps the brightest feature of our early history. When blood is spilled for a cause, we may well halt and think. It is not every man that is privileged to lay down his life freely, and not every cause that is worthy of a human life. But the story of the Indian missions of Canada is such that a sceptical world may neither smile nor sneer at it. There is not a more dramatic page in modern history. The missionary often went ahead of the explorer, as Bancroft has observed. Le Caron, the Franciscan, reached Allumette Island, before Champlain; the Jesuit Jogues traced out the path to the Mohawk valley with his own blood, and the black robe was the first to discover the great neutral nation spread out along the shore of Lake Erie, between Lakes Ontario and Huron, and severing the Iroquois from the Hurons on their original hunting grounds. There was not a single Indian tribe in the whole stretch of land, known or heard of by the Frenchmen of the time, that was not visited by missionaries. The Abenakis and Micmacs of Cape Breton, Prince Edward Island, Nova Scotia and New Brunswick; the Montagnais of Labrador and the north of the St. Lawrence to Hudson Bay; the Hurons and Algonquins of Quebec; the Iroquois of New York, between Lake Ontario and Hudson River; the Shawnees, Pottowatomies, Eries, Illinois and Missouris, from Michillimackinac and the Lake of the Woods to the head springs of Itasca: all these were seen by the men of prayer who lived among them, taught them all that they

could learn, nursed them in illness, shared their hardships, and died in their hamlets, either through violence or from the wear of apostolic toil. The spirit of Canadian history cannot be understood unless the lives and labours of these men are taken into account, and the similar work of the nuns is rehearsed from the beginning. The influence of the Hospitallers, at Quebec and Montreal, under Madame De la Peltrie and Mdlle. Mance, of the Ursulines, in the former, and the Congregation in the latter town, was preponderant from the first; and the student will lack a rare insight into the inner workings of the colony who overlooks the writings of Mother Mary of the Incarnation. And the splendour of all this romance is heightened by martyrdom. The slow and piecemeal tortures which Jogues underwent for several years, and his fearful mutilation and death, at the hands of the treacherous Mohawks, remind one of Prometheus, and would be set down as incredible and impossible in a modern work of fiction. No more exquisite suffering is read of in the annals of the Roman persecutions. Daniel's body was not only hacked into shreds, but his remains were flung into the fire, serving to crown the holocaust of his unfortunate Hurons. But when we come to the northern pines, and within sight and sound of the blue waters of Simcoe Lake, we are confronted by a tragedy than which none is recorded more sublime and terrible in the drama of Greece. Brebœuf, the greatest of all the Jesuits of Canada, a giant in limb and heart, was tied to a stake; his flesh slashed and eaten in his sight; his wounds blistered with red-hot stones and hatchet blades; his scalp torn away; and on his head, boiling water poured thrice in mockery of christening; his feet cut off; his chest cloven; his heart torn out and eaten. If one would learn a lesson in the philosophy of Canadian history, let him go to the Hotel Dieu, at Quebec, and stand before the silver bust holding Brebœuf's head, and remember that this great martyr had blue blood in his veins, had been pampered in his youth, was a nobleman of France and allied to the English house of Norfolk. And scarcely inferior will be the effect of the cruel death of the gentle Lalemant, Brebœuf's companion, who suffered only less because his weakly frame was unable to stand more from the outrageous Iroquois. This was in the memorable year 1649. For a hundred years after, and, indeed, up to our own time, the blood of the martyrs has been the seed of the Church; and the missions among Canadian Indians have continued to flourish, until, if you want another insight into the mysteries and romance of the history of New France, you have only to cross to Caughnawaga, over against Montreal, and inspect the low-browed ancient presbytery that overlooks the waters of the Cascades. There are the relics of 200 years—the register of the Church from 1735; a Jesuit ostensorium of 1669; an oil painting of Lafitau, the writer, who served there from 1712 to 1717; a wampum belt, two centuries old; a picture of St. Louis of France, patron of Sault St. Louis, the first name given to the village by Charles X; a Franciscan breviary, used by the Recollets when there; and the portrait, desk, arm-chair, and a book of Charlevoix, the historian, who dwelt herein several years, while writing his works and ministering to the Indians. There are also the remains and a full length picture of the Iroquois Virgin and Saint, and her MS. life in the most elegant Ciceronian Latin by her spiritual director. All these things, however slight in themselves, represent a fulness and mellowness which are the outputs of an elaborate system embodying much sound human philosophy.

## IV.

Taken all in all, Talon is perhaps the most useful man who ever wrought in Canada, and the inhabitants of New France were more beholden to him than to any other single man. Colbert and Talon worked together. Through Talon we come to the romance of administration. The great minister of Louis XIV devised a broad plan for the management of the colony, the unfolding of its resources, the permanence of its institutions and the warrant of its destiny; and he entrusted the working thereof to Talon, as Royal Intendant. That officer was in Canada for five years, at two several intervals, and in that time, may be said to have created the institutions of the country. The principle of the scheme was paternal, almost everything emanating from the government at home and everything being referable thereto. This was pleasantly displayed in the disposition of immigrants sent over by the King. As a rule, men of the one creed were chosen, Huguenots from the neighbourhood of La Rochelle being excluded, although the ban was not final nor prohibitive. Young women were shipped in great numbers, after careful choice for character, health, and a willingness to work. And Talon took care that they were duly wedded, which was the easier, because adult males not marrying might not trade, hunt, or fish, and a premium was set on matrimony. The girl, for her bridal gift from the King, got cattle, provisions and the wherewithal to build a house. Boys should marry at eighteen, girls, at sixteen. There was the King's gift of 20 livres for the boon. A pension of 100 livres was given to the father of ten children and of 400 to the parent of twelve. There is a smack of pastoral romance in this which inspired Abbé Raynal in his renowned description of the primitive Acadians, on which Longfellow founded much of his "Evangeline," translated by our colleague M. Pamphile Le May. Military officers and young men of noble families were encouraged by money rewards to remain in the country, and the result was the system of seigniories, which became, after a few generations, another romantic feature of Canadian history. The seignior received from his *censitaires* the fee of one twelfth of the purchase money of the estate. He was a justice within his domain, sitting on capital crimes, on small debts and misdemeanors punishable by fine, and seigniorial dues and profits. When the matter was worth while, appeal could be made to the Seigniorial or Royal Court, and thence to the Supreme Council. Talon returned to France in 1672, a few weeks after the arrival of that other spectacular figure, the old Marquis Louis de Buade Frontenac, Count of Palluau, who governed Canada in two terms, till the end of the century, with a grand presence and a hand of steel, holding his own against the Iroquois, and the sailors of Sir William Phipps, who asked the capitulation of Quebec, with the pretty story of the Admiral's flag, shot from the mast, introduced by Marmette in his novel, as well as in the ecclesiastical warfare for a courtier to face. Talon initiated the golden age of New France which Frontenac closed with the end of the seventeenth century, a little before the death of Louis XIV. On leaving the country, Talon bequeathed the institutions which he founded and which survive to this day in the province of Quebec, as well as the Seigniorie des Islets, erected into a barony, and containing three hamlets, the Bourg Royal, the Bourg de la Reine and the Bourg Talon. Talon was the farmer's friend, promoting the cultivation of flax and hemp, and the father of homespun or *étouffe du pays*, his boast being that he would have the peasants of New France clothed from head to foot in garments of their own make. He opposed the

monopolies of commercial companies, encouraged shipbuilding, the working of mines, and was among the first to appreciate the richness of the now famous St. Maurice iron beds. Indeed, the whole system of municipal government in the colony was due to his sagacity, and the same may be said of the management of civil and commercial affairs which obtained till the time of the Conquest. The name of Talon is still borne by one family in Canada, and a spirited painting of the great intendant is kept in a religious house of Quebec.

## V.

Canada has had her share of wars, all of which are more or less interesting, while several have been the theme of romance and verse. It has been fashionable to find fault with Champlain for his hostilities against the Iroquois, making bitter foes of tribes that might have been friends to his people. This is a moot point, but there can be no question of the glamour that clings to his first expedition along the Richelieu. That beautiful river, flowing through the garden of Lower Canada, has become legendary, for two hundred and fifty years, through the wars that have swept along its banks. It was the highway of the Iroquois from the Hudson, in their yearly raids by land and water, against the white settlements at Three Rivers, Quebec and Montreal. The French built a chain of forts—since historical—to check these savage marches. They were raised at Sorel, Chambly, St. Johns and Isle-aux-Noix. In 1667 De Tracy passed these on his way to scatter the Mohawks, while, three years later, 1670, De Courcelles chastised their brothers, the Senecas, by way of Lake Ontario. Just a hundred years after, in 1760, Haviland, with 300 British regulars, provincials and a small body of Indians, drove the French from Isle-aux-Noix and St. Johns, then wheeled up to Longueuil and reached Montreal in time for the final capitulation. Along that same line of the Richelieu, Montgomery moved victorious in 1775, on his march to Quebec, and along it, in 1776, the continental army retreated, after being shattered at Pres-de-ville and Sault-au-Matelot, and by the sufferings of a long winter. At St. Johns again, Burgoyne gathered a splendid army of land and lake forces to crush the American rebellion on the Hudson, and within two months had to lay down his arms at Saratoga, thus virtually ensuring the triumph of the colonial partisans. During the uprising of the French Canadians in 1837-38, the Richelieu valley was again the chief scene of operations, and such names as St. Denis, St. Charles, Point à la Mule have been enshrined in several books of light literature.

In searching for the causes of the great contests of modern times, we should not forget that the Seven Years' War began on this side of the water. Bancroft rightly says that when Washington gave the word to fire at Fort Duquesne, in 1754, he kindled the world into a flame. The war raged in America, Europe and Asia, until it ended in the downfall of New France, the establishment of British power in its stead, and the promotion of England to the undisputed supremacy of the seas, which has proved the foundation of her colossal colonial empire. In the Canadian campaign, there was the defeat of Dieskau, the victory of Ogdensburg, Fort George, and the massacre—on which Fenimore Cooper laid the ground work of his masterpiece, "The Last of the Mohicans,"—Ticonderoga, Louisbourg, Montmorenci, the Plains of Abraham, St. Foye, and the final surrender at Montreal. There was also the pathetic episode of the eviction of the Acadians in 1755, which, how-



ever it may be palliated by the stern law of military necessity, and in accordance with the political jurisprudence of the time, has been embalmed by Longfellow in verses that are the most popular of the age. We have also a Canadian novel on the subject, "Jacques et Marie," by our former colleague, Napoleon Bourassa. The hostilities had lasted over five years, with varying success, and incidents of unrivalled romance, until at length the war of giants ended in sorrow for the one side, in triumph for the other, and when all was over, the feeling was resolved into glory for both sides, as evinced by that monument raised in Quebec—a tribute of magnanimity, single of its kind in history—to the memory of the two heroes, the conqueror and the conquered, with a Latin inscription on the pedestal that is unexcelled in lapidary literature. The Seven Years' War lasted a couple of years longer, and it was not till 1763 that, by the Treaty of Paris—so mercilessly attacked by Junius as a backdown of the British commissioners, bought up with French gold—Canada definitely passed from France to England. That whole extraordinary campaign is a mine of research for the student of history, where the mystery of the French system can be discovered and sifted. From the literary standpoint there are few events that have brought out so many books of all sorts, not the least of which is the "Chien d'Or" of our esteemed colleague, William Kirby of Niagara.

## VI.

With the coming of British rule, the colours of Canadian history tone down a little, as becoming the character of the people at the head. The English took possession of Quebec in a matter-of-fact way; remained cooped up by the French during the first winter, and after the capitulation at Montreal held on to the whole country, as an army of occupation, for three years, until the Treaty of Paris, in 1763, made them masters there. They then went about the task of governing their new subjects in a quiet, business-like manner, under such sensible governors as General Murray and Sir Guy Carleton. The very first year, 1764, they started a printing press, and published the *Quebec Gazette*, the earliest paper in Canada, and which the people of the ancient capital unaccountably allowed to die some ten or twelve years ago. Things went on quietly during the first decade, the French people coming to understand their altered position and to find that they had not lost so much by the change after all. Their trust and satisfaction were enhanced when, in 1774, the famous Quebec Act was passed by the British Parliament, whereby the boundaries of the province were extended from Labrador to the Mississippi, and from the Ohio to the watershed of Hudson Bay; the French were allowed the civil right of following their creed and its forms; the tithes of the Clergy were confirmed; the French code was restored in civil cases and the English common law established in criminal causes. The ruling authority was put in the hands of a governor and a council of seventeen to twenty-three members, the latter appointed by the Crown, and, for the most part, Englishmen. The Quebec Act caused a terrible excitement, not only among the minority in Canada, but it may be said to have precipitated the revolution in the American colonies, because of the transfer of territory beyond the Ohio, and because of the religious privileges granted to the French of Canada. The latter showed their gratitude by the loyal stand they took, under their clergy, against the American invasion of 1775-6, when they rendered incal-

culable service by their knowledge of the country and their skill in arms. It was Joseph Bouchette, the well-known engineer and hydrographer, who piloted Sir Guy Carleton, with muffled oars, from Montreal past Sorel where the Americans were watching in force, and down to Quebec to take command of the capital during that lengthy siege; it was Dambourges, Dumas, and a giant named Charland, who performed prodigies of valour and strength in resisting Benedict Arnold's midnight attack at the Cul-de-Sac; it was Chabot and Picard, at Près-de-Ville, with thirty militiamen of their own nationality, who were in command of the log house and battery of three pounders, and a few British sailors, acting as artillerymen under Captain Barnsfare and Sergeant McQuarters, and from that battery was fired the most fateful shot that was ever belched from a gun's mouth. By it, thirteen bodies were stretched in a winding sheet of snow—for the storm was so fierce that memorable new year's night, that the American invaders had to cover the locks of their muskets with the lappets of their coats—and foremost among the slain lay Richard Montgomery. Then the remainder of the assaulting body, stunned by this first discharge, fell back in confusion and retreated in all haste to Wolfe's Cove. The same loyalty was displayed in the second American invasion of 1812–15. The Canadian Fencibles fought side by side with the British linesmen and the English-speaking militiamen; the names of Queenstown and Chateauguay are both entwined in wreaths of undying laurel, and while Brock's monument stands on the field where he died victorious, like Wolfe, the statue of De Salaberry stands at attention, for ever, in Chambly, where the hero's ashes rest in the peaceful churchyard.<sup>1</sup>

## VII.

In 1786 an important step forward was taken. Lord Dorchester—Sir Guy Carleton that was, and one of Wolfe's officers—was named Governor-General of British America, opening brilliantly a brilliant array of governors that has brought to our time such names as Dufferin, Lorne and Lansdowne. The maritime provinces having just been established under constitutional charters, the Canadians requested the same; and having got the Habeas Corpus and trial by jury in civil cases, as an instalment, they bade for more, and in 1791, obtained the Constitutional Act which could be set apart as the first step toward Canadian responsible government. Canada was divided into Upper and Lower, each province having a separate legislature, consisting of a Council, appointed by the Crown, an Assembly, chosen by the people, and a Governor, nominated by the home authorities, and responsible only to them. The first Lower Canada legislature met at Quebec in 1791, and the first of Upper Canada at Newark, the present Niagara, in 1792, and continued meeting there till 1797, when it removed to York, now Toronto, founded by Lieutenant-Governor Simcoe in 1793. From this date, and during the first quarter of the next century, the civil and political history of Canada is uneventful enough, although very interesting as a battle ground of the growing antagonism betwixt the conquered race, forming the majority, and the conquerors who were in a feeble minority, but had the whole influence of the Foreign Office at their back. The conflict waxed strong till

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<sup>1</sup> The literature of this period is represented by Coffin's *Chronicle*, a love story; *Les Fiancés de 1812*, by the late Joseph Doutre; Mrs. Curzon's *Laura Secor*, and the fine dramatic poem of Charles Mair, entitled *Tecumseh*,

1822, when the reunion of the two provinces was first broached, but violently opposed by the French. Then discontent began to prevail, and for the next fifteen years the political agitation grew very lively indeed. The fiftieth anniversary of the rebellion of 1837-38 is just going on, and the whole history has been raked up, especially in one of the Montreal papers. There was romance enough in the events of those two years to furnish material for an abundant literature, which indeed has been the case, the most notable of the French works being by M. De Boucherville, whose description of the battle of St. Denis, in "*Une de Perdue*," is quite entertaining. The revolt, however, was not without its good result, although that was not foreseen by its leaders. Lord Durham having been sent out to report on the situation, the home authorities determined, on the strength of his representations, to unite the two provinces and embody in their constitution the principle of responsible government. This Act took effect on February 6th, 1841. In June of the same year, the first united parliament met at Kingston; in 1844, the seat of government was carried to Montreal and, after the burning of the parliament building, in 1849, by a mob that resented the signing of the Rebellion Losses Bill, by the Governor-General, the Earl of Elgin, it was transported to Toronto and thence to Quebec. Finally, Ottawa was chosen, as a compromise, for the capital, and when Lower Canada resisted the principle of representation by population to the point of forcing a crisis, the broad scheme of confederation of all the provinces of British North America was broached, and one of the most romantic and beautiful dreams that ever played before the fancy of a statesman was carried out, as if by enchantment. And we are now making history, under that union or confederation, which will supply valuable chapters to Dr. Henry Miles's second volume, when it is published, and to the next edition of our respected colleague Dr. Withrow's, excellent handbook. And this reminds me that our historical literature deserves a word. Besides the names already mentioned, we have in our own time Garneau, Bibaud, Ferland, Faillon, Verreau, Chauveau, Desmazures, Daniel, Tanguay, Casgrain, Faucher de St. Maurice, Rousseau. Sulte, Christie, Haliburton, Scadding, Dent, Harvey, Kingsford, Brymner (in his *Archives*), Bryce and others, whose works are valuable. The full history of Canada has yet to be written, however. As Canada is a specially hard country to govern, so its history is particularly difficult to write. But it is bound to come from a pen that understands the French period, with its mystical and medieval agencies, and that understands the English spirit as well, and that whole scheme of fair play which has made the French, under British rule, the freest and happiest people under the sun. Meanwhile we should all strive to study the history of Canada in the spirit of those who were the prime movers therein; discarding modern standards of fault-finding and sneering; divesting ourselves, so far as may be, of the warping prejudices of race, creed and tongue, and deriving from even its romantic aspects, not spectacular enjoyment merely, but those lessons of necessary cause and effect; those interventions of providence, and those mysteries of the chapter of accidents which they appreciate who understand what is meant by the philosophy of history.



II.—*The Last Decade of French Rule at Quebec, 1749—1759.*

By J. M. LEMOINE.

(Read May 25, 1888.)

The interest shown by this Section in Canadian history, may render acceptable the sketch I shall now present of the governing circles at Quebec, during the last decade of French rule—a very dark page in Canadian annals. I am well aware that our historians have, in a general way, done justice to the closing era of the Bourbon regime in New France. I wish, however, to enlarge on the subject, and to acquaint you with the very text of a curious memoir bearing on those times, adding a few comments. This memoir, I have reason to believe, is little known to the English-speaking community, there being so far no translation into their language.

In the year 1838, a committee of the Literary and Historical Society, of Quebec, of which the learned George B. Faribault was the leading spirit, urged upon the association the propriety of publishing a French MS.<sup>1</sup> of some 207 pages, placed in the hands of a member of the committee by an influential person in Montreal, who received it from Gen. Burton, at one time after the Conquest commandant in that city; there seems to have been also extant a second copy, in the possession of the Hon. Thos. Dunn, a high official in his day. Mr. Dunn seems to have communicated this document to the Hon. Wm. Smith, as he quotes several passages from it in his "History of Canada," published at Quebec in 1815.

This memoir presents a graphic, dark but vivacious portraiture of the dealings of the high officials, during the last years of French power. It is quite in accord with the record drawn up by the general historian, only it is much more circumstantial.

The writer must have been an official himself, admitted behind the scenes, but ready to handle without gloves the accomplished villains, who dishonored France and oppressed the colony. Canada, deserted and betrayed, seems to have been ripe for a change of rule. On perusing this memoir, one can easily understand why the oppressed and neglected colonists so readily accepted the new regime with its guarantees, so soon as it became an accomplished fact.

Let us scan some of the incidents of this drooping period, so strikingly portrayed in the *entourage* of Intendant Bigot.

Prepare for the downfall of French power in New France. Selfishness, lust, and

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<sup>1</sup> Mémoires du S— de C—, contenant l'Histoire du Canada durant la Guerre et sous le Gouvernement Anglois : Published by the Literary and Historical Society, of Quebec, under the title "Mémoires sur le Canada, depuis 1749 jusqu'à 1760, en trois parties, avec Cartes et Plans Lithographiés, publié sous la direction de la Société Littéraire et Historique de Québec en 1838. Ré-imprimé par elle en 1873 : Middleton & Dawson, Québec."

rapine, are rapidly taking the place of patriotism, public spirit and probity, among Canadian officials. For good or for bad, we may expect to find society in the colony a reflex of what it was in the parent state. The waters of the brook cannot be pure, when the stream that feeds it pours forth the sewage of the city.

War-loving France, staggering under reverses in Germany, in the East and West Indies, with an empty treasury, had not the means, even if she had the heart, to defend her distant offspring against foreign aggression.

Alas, chivalrous old France of Henry IV, to what depths of infamy art thou descending! Lower still shalt thou have to sink. Thy streets, thy squares, thy palaces, thy hamlets, will yet be deluged with blood, ere matters mend! There is yet, however, on earth, a power who can shield from the guillotine the few devoted sons you may forget on Canadian soil—your old rival, Great Britain.

Oppressive taxes were heaped on the people in France, the privileged classes claiming exemption, in order to carry on distant and useless wars, or to pamper court favorites. Vice, luxury, unbridled license were rampant amidst the privileged classes, the nobles and higher clergy; open profligacy, at court. Quebec received her fashions and her officials from France; the latter came with their vices; several of these vices were expensive. The French Sultan, Louis XV, must needs have his harem, his gambling tables, his rouged mistresses, his *parc-aux-cerfs*. The highway to fortune, for courtiers, lies through the smiles of La Pompadour. Quebec, too, possessed its miniature French court, on the green banks of the St. Charles. Gilded vice flaunted at the intendant's palace; gaunt famine preyed on the vitals of the people. It was so at Versailles. It was so at Quebec. Lust, selfishness, rapine, everywhere, except among the small party of the *Honnêtes Gens*, such as de Montcalm, de Vaudreuil, de Longueuil, de Bougainville, de la Corne, de Beaujeu, Taché, de Lery, de St. Ours, and a few others; it was a carnival of pleasure, to be followed by the voice of wailing and by the roll of the muffled drum.

In 1748, the evil genius of New France, La Pompadour's *protégé*, Francois Bigot, thirteenth and last intendant, landed at Quebec.

Born in Guienne, of a family eminent at the bar, Bigot, prior to coming to Canada, had occupied the high position of intendant in Louisiana and Acadia. In stature he was small but well proportioned, active, full of pluck, fond of display and pleasure, and an inveterate gambler. Had he confined his operations merely to trading, his commercial ventures would have excited but little censure, trading having been resorted to by several high colonial officials. His pay was totally inadequate to the importance of his office, and quite insufficient to meet the expenditure his exalted office led him into. His speculations, his venality, the extortions practiced on the community by his heartless minions—all this is what has surrounded his memory with infamy and made his name a byword for scorn.

There existed, at Quebec, a ring composed of the intendant's secretary, Deschenaux; of the commissary-general of Supplies, Cadet; of the town-major, Hugues Péan; of the treasurer-general, Imbert. Péan was the chief and Bigot the great chief of this nefarious association. Between Bigot and Péan another link existed. Péan's favor at court lay in the charms of his wife, Madame Péan, *née* Angelique de Meloises, who was youthful, pretty, witty, attractive, of ready repartee—in fact so captivating that Francois Bigot was entirely ruled by her during all his stay at Quebec. At her house in St. Louis

Street, he spent his evenings; there he was sought and found, in May, 1759, by Colonel de Bougainville, returning from Paris, the bearer of the official dispatches, announcing the impending struggle.

Here are some of the pen photographs which the clever writer of the memoirs has left—disclosing the corrupt surroundings of the luxurious intendant:<sup>1</sup>—

“Brassard Deschenaux, the son of a poor cobbler, was born at Quebec. A notary, who boarded with Deschenaux senior, had taught his son to read. Naturally quick and intelligent, young Deschenaux made rapid progress under his tuition and had soon something to do in the office of Intendant Hocquart, where Bigot found him and succeeded in having him named a clerk in the Colonial Office at Quebec. Industrious, but at heart a sycophant, by dint of cringing he won the good graces of Bigot, who soon put unlimited trust in him to such a degree that he attempted nothing without Deschenaux's aid. But Deschenaux was vain, aspiring, haughty, overbearing, and of such inordinate greed that he was in the habit of boasting ‘that to get riches he would even rob a church.’

“Cadet was the son of a butcher. In his youth he was employed in minding the cattle of a peasant. He next set up as a butcher and made money. His savings he invested in trade; his intriguing spirit had brought him to the notice of the intendant, who awarded him contracts to supply meat to the army. Deschenaux was not long in discovering that Cadet would be useful to him. He made a friend of him and lost no opportunity of recommending him to the intendant. He was accordingly often employed to buy the supplies for the maintenance of the army. In truth there were few men more active, more industrious, more competent to drive a bargain. The King required his services and requited them by having Cadet named commissary-general. Cadet had his redeeming points: he was open-handed in his dealings, kindly in manner and lavish to excess in expenditure.”

The worthy commissary-general, like Péan, was blessed with a charming wife, whom Panet's *Siege Diary* styles *La Belle Amazone Aventurière*. Probably, like her worthy spouse, of low extraction; “elle n'étant pas sortie de la cuisse de Jupiter,” to use a familiar French saw.

Madame Cadet, later on, transferred her allegiance from the rich butcher Cadet, to one “Sieur Joseph Ruffio.” Hugh Péan, a Canadian by birth, had succeeded his father Capt. Hughes Péan, town-major of Quebec. Totally unfit for the post, he had been re-

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<sup>1</sup> Old memoirs furnish curious details of the flittings of the great intendant between Quebec and Montreal. The parliamentary library in this city (Ottawa) contains a lengthy and interesting MS. account, written by a French official of the day, M. Franquet, inspector of fortifications in New France, in 1752. Franquet came here charged with an important mission. He was just the man whom Bigot thought should be dined and wineed properly. Thus we find the royal inspector invited to join the intendant on a voyage to Montreal. The government “Gondola,” a long, flat bateau, propelled by sails as well as by oars, accordingly left the Cul de Sac landing at Quebec, on July 24th, 1752. It could carry eight hundred pounds burden, with a crew of fourteen oarsmen. Amidships there was a space about six feet square, inclosed by curtains and “with seats with blue cushions,” says the memoir; a dais overhead protected the inmates from the rays of a July sun, and from rain. Choice wines, spirits, pasties—even ready cash—everything conducive to human sustenance or pleasure was abundantly provided. History tells us there was nothing ascetic about the gay bachelor Bigot. Ladies of rank, wit and beauty felt it an honor to join his brilliant court, where they met gay Lotharios—young officers of the regiments stationed at Quebec. There were seats for the fair ones in the government gondola. M. Franquet made the most of the voyage, enjoyed himself amazingly, and describes some merry episodes and junketings which occurred at Three Rivers and other trysting places, in excellent keeping with the daily routine of the magnificent intendant.

commended to the Government by the all powerful intendant. Péan was not long in discovering that, with a master such as Bigot, he could dare anything. Had he not, without any trouble, netted on grain 50,000 half-crowns? A large quantity of wheat was required by the Government; he was charged with buying it. There lay a fat job in store for the town-major. How was his master, the intendant, to manage the case for him? Bigot was a man of resource, able to think for his friends. First, he provided Péan with a large sum out of the treasury, to buy the wheat as low as possible for cash, and then, his complaisant council passed an order or *ordonnance* fixing the price of grain much higher than that at which Péan had purchased. The town-major charged it to the Government at the rate fixed by the *ordonnance*; the difference between the two rates left him a handsome profit. He next tried his hand at building coasting crafts, which he could manage to keep constantly in commission for the Government; this also was lucrative. Other devices, however, were resorted to: a secret partnership was entered into between Cadet and a person named Clavery, who shortly after became storekeeper at Quebec. Cadet was to purchase wheat in the parishes, have it ground at a mill he had leased, the flour to be sent abroad secretly. Péan, too, had large warehouses built, at Beaumont, some say. Cargoes of grain were thus secretly shipped to foreign ports in defiance of the law. Breard, the comptroller-general, for a consideration winked at these malpractices, and from a poor man when he landed in Canada, he returned to France in affluent circumstances.

The crowning piece of knavery, was the erection of a vast shop and warehouse near to the intendant's palace. Clavery had charge of this establishment, where a small retail business was carried on as a blind. The real object was to monopolise the trade in provisions and concentrate it there. Clavery was clerk to Estebe, royal storekeeper at Quebec. In this warehouse were accumulated all such provisions and supplies as were wanted annually, and ordered from France for the king's stores at Quebec.

It was customary for the intendant to send, each summer, requisitions for supplies to Paris. Bigot took care to order from France less supplies than were wanted, so as to have an excuse to order the remainder, in times of scarcity, at Quebec. The orders were sent to Clavery's warehouse, where the same goods were sold over again, at increased rates. Soon the people saw through the deceit, and this repository of fraud was called, in consequence, *La Friponne* (the cheating house.) Montreal, though better off than Quebec for food supplies, suffered as much as the latter from the vexatious proceedings of Bigot's ring; trade at that date was very low at the Royal Mount. It also had its *Friponne* under the personal care of Penisseault, so notorious as the lieutenant of the commissary-general of supplies, Cadet. Varin, the commissary-general of marine, and Martel, the king's storekeeper, had monopolised everything. The memoirs depict these two worthies as follows:—

“François Victor Varin, was born in France; some said his sire was a shoemaker by trade, while others made him out the son of a schoolmaster; he was vain, untruthful, arrogant, capricious and obstinate, small in stature, his face was unprepossessing and his morals of the worst.”

“Martel was the son of a merchant, formerly established at Port Royal. On its surrender to the English, he settled at Quebec. Poverty soon compelled him to seek for employment. He had a brother who was a Jesuit; through his influence he and



three other of his brothers found protectors, who pushed them on beyond their most sanguine hopes."

Varin and Martel, by monopolising the outfits of the traders and of their canoes, with the assistance of the *Fripoune*, brought commerce at Montreal to its lowest ebb, and raised a storm of indignation.

Cadet had, in his employ, for several years, a person by the name of Corpron, a worthless clerk, previously expelled from several mercantile houses for his rogueries, but withal, intelligent and a good business man. Corpron having a share in Cadet's ventures had become his confidential agent. His searching eye pried the first into the official returns and public accounts of expenditure furnished to the Commissary General. None knew what his particular share of the spoils might be, but ere long he was reputed to be enormously wealthy. The charge of Montreal and of the more distant posts were entrusted to Penisseault and Maurin.

"Penisseault was preëminent for out-door duty; successful in conducting negotiations and in overseeing public works; ever watchful, but treacherous and double in his dealings. It was reported that he had been compelled to leave France on account of business transactions. He had married quite a handsome wife, the daughter of a Montreal merchant. She became Péan's mistress, but the great Chevalier de Lévis, on returning to France, carried her off with him." The Canadian Aspasia is likely to reappear, hereafter, in Paris, as a successful suppliant for favours from Duke de Choiseul. Not unlike the Barons of old, General de Lévis seems to have claimed the feudal right of *prelibation* of the choicest products of the colonists, their wives included. The memoirs add that gallantry, on the part of the witty, pretty but frail Madame Penisseault, though it "alienated" her from her licentious spouse, failed to cause a rupture between them. The accommodating official instead of drowning himself, or blowing out his brains, or sighing for a divorce, found solace in the favours granted him by the wives of his subalterns.<sup>1</sup>

Let us close this mosaic of public plunderers, debauchees and demireps which France either sent or maintained in Canada, with the pen photograph furnished of the hideous hunchback Maurin. How long might not this intolerable state of things have lasted under the Bourbons? Madame de Pompadour, who ruled at Versailles, under the name of Louis XV, was, unquestionably, well represented at Quebec. Here is what the memoirs say of this notable member of the ring:—

"Maurin was the most deformed man in the colony; he was a hunchback, with a sinister expression in his face and in his whole deportment, but nature had imparted to him wit and even culture. He carried expenditure, in Canada, to its extreme limit, and as to hoarding money, Cadet could not have selected two more successful men than Maurin [and Corpron] uniting craftiness to vexatious means. Never was there in the colony, a more striking example of public robbery, followed by profuse expenditure—remaining defiant and unpunished."

It seems incredible to realise the horde of low-born parasites and hirelings surrounding Bigot, and the number of intriguing women paying court to the reigning favourite, Madame Péan.

<sup>1</sup> "Sa vie licencieuse l'aliéna d'elle, sans cependant rompre; et il s'en dédommagea sur les femmes de ceux qui étaient sous ses ordres." *Mémoires sur les Affaires de la Colonie, 1749—1760*, p. 87.

In 1755, the wheat harvest having failed, and the produce of former years having been carried out of Canada, or stored in the magazines of Bigot's ring, the people of Canada were reduced to starvation ; in many instances they had to subsist on horse flesh and decayed codfish. Instead of having recourse to the wheat stored here, the intendant's minions led him to believe that wheat was not so scarce as the peasantry pretended ; that the peasants refused to sell, merely in anticipation of obtaining still higher rates ; that the intendant, they argued, ought to issue orders for domiciliary visits in the rural districts, and levy a tax on each inhabitant of the country, for the maintenance of the residents in the city, and of the troops.

Statements were made out, showing the rations required to prevent the people from dying from starvation. Cadet was charged with the levying of this vexatious impost. In a very short time, he and his clerks had overrun the country, appropriating more wheat than was necessary. Some of the unfortunate peasants who saw, in the loss of their seed wheat, starvation and death, loudly complained. A few called at the intendant's palace, but the heartless Deschenaux, the intendant's secretary, was ever on the watch, and had them questioned by his employees, and when the object of their visit was discovered, they were ushered into the presence of Deschenaux, who browbeat them and threatened to have them cast into prison, for thus presuming to intrude upon the intendant. Bigot was afterwards advised of their visit, and when they appeared before him, they were so maltreated and bullied, that they left, happy at believing that they had escaped being thrown into prison. Soon none dared to complain. Bread was getting scarcer every day. The intendant had named persons to distribute the bread at bakers' shops, flour being furnished by Government. The people crowded the bakeries on the days fixed ; the loaves were greedily and violently snatched up ; mothers of families complained that they could not get any ; they occasionally besieged the intendant in his palace, with loud lamentations ; it was of no avail. Surrounded by a crowd of flatterers, who retired gorged with luxurious living, the intendant could not understand how the poor could die of hunger.

Land of New France, reclaimed from barbarism at the cost of so much blood, so much treasure ; bountifully provided with nobles, priests, soldiers, fortifications by the great Louis ; sedulously, paternally watched over by Colbert and Talon and Frontenac, to what depth of despair, shall we say, degradation,<sup>1</sup> art thou sunk ? Proud old city of Quebec, have you then no more defenders to put forth, in your supreme hour of woe and desertion ? Has then that dauntless race of *Gentilshommes Canadiens*, the d'Iberville, Ste. Helène, de Rouville, de Bécancourt, de Repentigny, disappeared without leaving any successors ?

The limit of my address forbids me rehearsing the heartrending scene in our city, when the roll of muffled drums and voices of wailing proclaimed that France's chivalrous leader, Montcalm, had just returned through St. Louis Gate from his last campaign, stricken unto death.

This is only a faint outline of the gloomy incidents of this drooping period.

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<sup>1</sup> Servants, lacqueys and nobodies, were named storekeepers. "Leur ignorance et leur bassesse ne furent point un obstacle." "Neither their ignorance nor their baseness, were obstacles to their advancement," say the Memoirs. "Madame Péan had whom she choose appointed to offices ; her recommendation did more than the highest merit could effect." *Mémoires sur les Affaires de la Colonie, 1749—1760.*

Two skilful novelists, our colleagues, the one in the English language, Wm. Kirby, of Niagara,<sup>1</sup> the other in the French, Joseph Marmette, now of Ottawa,<sup>2</sup> have woven graphic historical romances out of the materials which the career of Intendant Bigot, and and the desertion of the colony in its hour of trial, by France, so abundantly supply.

One flash of sunshine lights up the latest phase of French rule the sturdy devotion of the Canadian militia towards its oblivious mother country; their feats at the Beauport engagements, on July 31st, 1759, their usefulness as auxiliaries, after the battle of the Plains of Abraham, and at Levi's victory at Ste. Foye, on April 28th, 1760, a day glorious to French arms, but a bootless victory.

You have just witnessed the fall of the curtain over the last scene of the great French drama, a pageant once so gorgeous at Quebec—now, alas! very sorrowful. Let us, for a moment, dwell on the stern justice visited by oblivious France, on the leading actors in the recent scenes of public plunder, rapine, lust<sup>3</sup>—some say—treason, perpetrated; fifty-five of them had been indicted.

On December 10th, 1763, a Royal commission of twenty-seven judges, at the Chatelet, in Paris, presided over by M. de Sartines, lieutenant-general of police, delivered the following sentences, on François Bigot and his accomplices, who for fifteen months had been locked up in the Bastille awaiting their trial:—

BIGOT.—Perpetual banishment; his property to be confiscated; 1,000 *livres*, fine, and 800,000 to be refunded.

VARIN.—Perpetual banishment; his property to be confiscated; 1,000 *livres*, fine, and 800,000 to be refunded.

CADET.—Nine years' banishment; 500 *livres*, fine, and 300,000 to be refunded.

PENISSEAU.—Nine years' exile; 500 *livres*, fine, and 600,000 to be refunded.

MAURIN.—Nine years' exile; 500 *livres*, fine, and 600,000 to be refunded.

CORPRON.—Condemned to be admonished in Parliament; 6 *livres* to the poor, and 100,000 to be refunded.

<sup>1</sup> *Le Chien d'Or*, by Wm. Kirby: New York and Montreal, Lovell, Adam, Wesson & Co., 1877.

<sup>2</sup> *L'Intendant Bigot*, by Jos. Marmette: Montreal, George E. Desbarats, 1872.

<sup>3</sup> The accusations, says Dr. H. Miles, which were more or less completely proved, were substantially as follows: "That illegal compacts existed between Bigot and four other officials, for the purpose of monopolizing to themselves the commerce of the colony, and which resulted in the commission of innumerable frauds; that false entries were made relative to commodities and necessities purchased for the King's service, in which the prices and quantities were overstated, so as to produce enormous gains to those concerned in the transactions; that on one occasion the cargo of a captured English merchant vessel had been purchased on the King's account for eight hundred thousand francs and then charged nearly two millions; that in course of 1757 and 1758 the confederates had realized profits amounting to twenty million francs on two single transactions concerning the purchase of provisions and equipments; that Bigot and his accomplices, for the purpose of effecting these gigantic frauds, bribed the commandants, commissaries and guardians of stores at the different forts; that, under the pretext of provisioning the different fortified stations of the colony, charges were made for the transport of supplies which were fictitious, existing only on paper; that at the very time when the soldiers were without necessities the King was charged for rations and complete sets of equipments never furnished to the troops; that cargoes of merchandise, imported at the expense of the King, were sold to contractors and then re-sold to the King at a fourfold price; that while the King was made liable by means of false entries for the payment of supplies two or three times over, the soldiers and militia were suffering from want and obliged to buy at their own cost those necessities which had been provided by the King for their use; that the Intendant and his subordinates, as well as several officers being in league to defraud the King, those who were injured could not obtain justice or even raise their voices against the administration, and that no honest merchants were permitted to have any shares in the contracts for supplies; that Bigot caused the sale of peltry, on the King's account, to be made at very low prices to his agents in order to profit by the subsequent disposal of it in the ordinary way of business; and that finally Bigot and his subordinates were guilty of constantly making untrue declarations and entries to conceal their fraudulent practices, falsifying everything relating to the actual expenses by changing their title, nature, object and amounts." Miles's *History of Canada*, French Regime, p. 350.

ESTEBE.—Condemned to be admonished in Parliament; 6 *livres* to the poor, and 100,000 to be refunded.

DE NOYAN.—To be admonished in Parliament; 6 *livres* to the poor.

BREARD.—Nine years' exile from Paris; 500 *livres* fine, and 100,000 to be refunded.

MARTEL DE ST. ANTOINE.—Condemned to be admonished in Parliament; 6 *livres* fine, and 100,000 to be refunded.

The ten offenders were to be incarcerated in the Bastille, until the amounts were paid.

Dussieux adds, that the pretty Madame Penisseault succeeded, through the Duke of Choiseul, Louis XV's minister, in obtaining for her husband a pardon with permission to retain his ill-gotten gain. This is the last trace that we find in history of the Canadian Aspasia.

III.—*The Basques in North America.*

By JOHN READE.

(Read May 25, 1888.)

To the dwellers on this side of the Atlantic, the Basques are a people of exceptional interest, as well from certain features of their language, as from their geographical situation and their early voyages to the shores of the New World. M. Paul Gaffarel of Dijon is inclined to believe that there is some groundwork of truth in the tradition, which credits the Basque sailors and fishermen with a knowledge of America long before the close of the fifteenth century.

It is well known that the Basques were for centuries engaged in the whale fisheries of their own seas. Some years ago, Mr. Clements R. Markham visited the seaports of the Basque provinces for the express purpose of gathering information concerning that ancient industry. In the report on the result of his inquiries which he subsequently presented to the Zoological Society, he said that he had set foot in every important town on the coast from the French frontier to Cabo de Peñas, comprising the provinces of Guipuzcoa, Vizcayo, Santander and Asturias. He found that the Biscayan whale fishery was a well established trade in the twelfth century and that it had probably been in existence for two centuries earlier. Such adepts, indeed, did the Basques become in that arduous and somewhat hazardous pursuit that, as soon as the English and Dutch entered upon the Arctic whale fishery, their services were in great requisition and were highly prized.

In 1612, James I of England wrote to the king of Spain asking for permission to engage for English vessels Basque seamen skilled in the use of the harpoon. In the course of time the English learned to wield that powerful weapon themselves, but it was to the Basques that they owed their primary instruction. In the middle of the seventeenth century the whales of the Biscayan waters became very scarce, and the Basques had to extend their voyages to alien seas in order to make them profitable. Even at a much earlier period, they had been wont occasionally to push their quest to a considerable distance northward and westward. Growing more and more adventurous, they were borne by favorable winds from island to island, till finally, we are told, they reached the shores of the opposite continent. The honour of the discovery is assigned by some to Jean de Echaide, by others to Matias de Echeveste. According to M. Paul Gaffarel, an island called Scorafisca or Stokafisca, is marked on the seventh sheet of Andrea Bianco's atlas, which dates as far back as 1486. The island in question is situated considerably westward in the Atlantic, not far from where Newfoundland might be looked for. The earliest editor or publisher of that atlas, Formaleoni, suggested that the name might be a corruption of "Stockfish," and indicate a knowledge of the Newfoundland cod fishery.

Mr. Justin Winsor, states that a pilot's chart of the year 1400, had inscribed the

names, "Antillia" and "De la man Satanaxio", "which", he says, "some have claimed as indicating a knowledge of the two Americas<sup>1</sup>." Perhaps, says M. Gaffarel, with respect to Bianco's chart, Echaide had communicated his discovery to others who had made it known to the cartographer. However that may be, it is certain that from the middle of the fifteenth century, all the ocean charts indicate the existence of a number of islands, which bear the name either of Stockfish, in one or other form, or of Baccalaos, which has virtually the same meaning. The strange thing about this last word is that it is the ordinary Basque term for "cod." The Spanish borrowed it from the Basques, and Cervantes uses it in his immortal story of the Knight of La Mancha. The memory of its attribution to Newfoundland is perpetuated in the islet of Baccalaos, at the northern extremity of Conception Bay. Nor is this the only memorial left by the Basques of their early visits to North American waters.

Not long since, the attention of the Rev. M. Harvey, author of "Newfoundland", was directed to a couple of tombs in an ancient cemetery near Placentia, which bore inscriptions in a language unknown to the islanders. In the summer of 1886, Mr. Courtney Kenny, M. P. for Barnsley, Yorkshire, while on a visit to Newfoundland, copied these inscriptions, and, on his return to England, submitted them to Dr. Robertson Smith, the well known orientalist. With little hesitation, that learned professor pronounced them to be Basque. "Who could have expected", writes Mr. Harvey, in the *Montreal Gazette*, "to find such a relic of a world that has passed away in such a remote and little known locality as Placentia? What changes have passed over the New World since those ancient mariners lay down for their last sleep in the Placentia 'God's Acre?' Their names, cut deep in one of our hardest rocks, have been able to resist the gnawing tooth of time." The former presence of the Basques in Newfoundland is also evidenced by the names of places on its coast. Rognouse is supposed to be a corruption of Orrougne, near Saint Jean de Luz. Cape Ray is said to be derived from the Basque *urraico*, pursuit or approach. Cape Breton was so designated from its resemblance to the projection of the same name north of Bayonne. Cape de Gratz comes from *grata*, a fishing station. Ulicillo, Ophorportu, and Portuchoa, are also Basque terms, signifying respectively, "fly-hole," "milk-vessel" and "little harbour." Labrador is also claimed to be a remembrancer of the Labourde district, which gives a distinctive name to a dialect of the Basque language. M. Joseph Marmette suggests that the name *cañada* (canal) may have been given by the Spanish Basques to the St. Lawrence, of which the first glimpse from the entrance of the Gulf would suggest the implied resemblance.<sup>2</sup> Senhor Luciano Cordeiro gives the same derivation.<sup>3</sup> Although, writes M. Gaffarel, there is no authentic proof of those early voyages, there are still strong presumptions in their favour. There is, indeed, every reason to believe that, what in 1492 was accomplished with all the *éclat* of official authority, had long before been effected silently and noiselessly by those humble Basque fishermen.

Confirmatory evidence is found in an extract from an ancient manuscript, dated 1497, which is reproduced in the "Collection de Manuscrits," recently published by the Government of Quebec. "Although," it runs, "we have no written record of the earliest

<sup>1</sup> Narrative and Critical History of America, ii. 38.

<sup>2</sup> Le Canada et les Basques, par F. de Saint-Maurice, Joseph Marmette et N. Levasseur, avec avant-propos par le Comte de Premio Real.

<sup>3</sup> L'Amérique et les Portugais, in Compte-Rendu du Congrès des Américanistes, 1875, vol. i. p. 475.

voyages of the French to the New World, there is nevertheless ample traditional evidence that they made several distant expeditions before the discoveries of the Portuguese and Spaniards. The Basques and the Bretons had for several centuries the monopoly of the whale and cod fisheries, and it is remarkable that Sebastian Cabot, on discovering the coast of Labrador, should have found there the name *Bacallaos*, which in the Basque language signifies cod-fish."

Abbé Faillon<sup>1</sup> writes that long before Jacques Cartier's time, the sailors of Normandy, Brittany and the Basque provinces, had given names to several ports on the Atlantic seaboard and the shores of the Gulf, and Father Charles Lalemant, writing home from Quebec in 1626, drew attention to the fact that the Indians of the country called the sun "Jesus", a name which, he believed, they had learned from the Basques who formerly dwelt there.<sup>2</sup>

Lescarbot, indeed, went so far as to say that, so long and so intimate had been the intercourse between the Basques and the aborigines of Newfoundland and the Gulf shores, that the language of the latter had come in time to be half Basque. If such a development of any native American tongue had really taken place, it would give to the theory of Basque-American affinity a ratification that would be welcome to its advocates. As yet, however, the statement of the versatile Lescarbot has not received that verification which would alone give it any value.

We have, it is true, ample evidence, after the beginning of the sixteenth century, of the enterprise and energy with which the Basques pursued their calling as fishermen in Canadian waters.<sup>3</sup>

It appears, however, that the intercourse of the Basques with the Indian population was confined, for the most part, to such communications as were called for in the pursuit of their chosen industry. They seldom made any long stay on land, and still more rarely did any of them decide to settle in the New World.<sup>4</sup> The early colonists of New France were mainly from Normandy, Perche, Aunis, Poitou, Brittany and Saintonge. The mass of them were from north of the Loire. If the Basque provinces furnished any at all, they were extremely few. The Basque sailors and fishermen crossed the Atlantic, not as colonists, but as traders. Their ambition was to make a little fortune and return home to their own land. When they did emigrate, it was not to Canada but to Mexico and to South America that they directed their course. If, therefore, it were proved beyond any suspicion of doubt that the Basques had obtained a knowledge of the northern portion of America even before the time of Columbus, our interest in them would not so much lie in that fact, which has had but a trifling influence on our national evolution, as in

<sup>1</sup> *Histoire de la Colonie Française en Canada*, i. 1.

<sup>2</sup> *Relations des Jésuites*, 1626, p. 4.

<sup>3</sup> That what the Basque fishermen and others who visited this continent in comparatively recent times found so easy a task, was equally practicable in ages more remote, has been clearly brought out by Sir Daniel Wilson in his paper on "The Lost Atlantis," in the *Transactions of the Royal Society of Canada* for 1886. On the same subject may be consulted Wilson's *Prehistoric Man*, ii. chaps. 19, 22 & 24; Humboldt's *Kosmos*, ii. 601-612; Bancroft's *Native Races of the Pacific States*, v. 102-129; *The North Americans of Antiquity*, by John T. Short, chap. iii; *Histoires des Grands Voyages*, by Jules Verne, i. 1-150, chaps. i-vi; *Les Normands sur la Route des Indes*, by Gabriel Gravier; Rafn's *Antiquitates Americanæ*, and essays by Messieurs E. Beauvois, Paul Gaffarel, Luciano Cordeiro, etc., on the Voyages of the Phœnicians, Carthaginians, Greeks, Romans, Welsh, Irish, Northmen, Portuguese, etc., in the *Comptes-Rendus of the Congrès des Américanistes*, etc.

<sup>4</sup> Frontenac had Basque blood in his veins.



certain possibilities which it suggests, when considered in connection with the peculiar structure common to the Basque language and some American families of speech.

"I must not mention these amalgamating languages," writes Dr. Farrar, "without calling your attention to the fact that one of the very few isolated languages of Europe exhibits, strange to say, the only cis-Atlantic instance of this very peculiar structure. It is the Eskura or Basque, spoken in the valleys of the Pyrenees, on the borders of France and Spain in an angle of the Bay of Biscay. The ethnological and linguistic affinities of this language, though repeatedly inquired into, have never yet been satisfactorily ascertained. Its existence there remains at present an insoluble problem, but what is certain about it is that its structure is polysynthetic, like the languages of America. . . . The most daring of all the hypotheses which have been suggested, points to the conceivable existence of some great Atlantis—to the possibility of the 'Basque area being the remains of a vast system, of which Madeira and the Azores are fragments, belonging to the Miocene period.' Be this as it may, the fact is indisputable and is eminently noteworthy, that, while the affinities of the Basque roots have never been conclusively elucidated, there has never been any doubt that this isolated language, preserving its identity in a western corner of Europe between two mighty kingdoms, resembles in its grammatical structure the aboriginal languages of the vast opposite continent, and those alone.<sup>1</sup>"

Prof. W. D. Whitney writes on the same subject: "Before leaving the Eastern Continent, we must return to Europe for a word or two upon one language which has as yet found no place for notice—the Basque, now spoken in four principal dialects and a number of minor varieties, in a very limited mountain district of the angle of the Bay of Biscay, astride the frontier, but chiefly on the Spanish side. It is believed to be the modern representative of the ancient Iberian, and to have belonged to the older population of the Peninsula, before the irruption of the Indo-European Celts. Traces of local nomenclature show it to have occupied also at least the southern part of France. The Basques may then be the sole surviving relic and witness of an aboriginal western European population, dispossessed by the intrusive Indo-European tribes. It stands entirely alone, no kindred having yet been found for it in any part of the world. It is of an exaggeratedly agglutinative type, incorporating into its verb a variety of relations which are almost everywhere else expressed by independent words. The Basque forms a suitable stepping-stone from which to enter the peculiar linguistic domain of the New World, since there is no other dialect of the Old World which so much resembles in structure the American languages.<sup>2</sup>"

"The language of the Iberians", says M. Demogeot, "which by themselves was called Escara or Euscara, has been the subject of curious researches. It seems to be certain that it did not differ essentially from the Basque, which is still spoken on both sides of the Pyrenees."<sup>3</sup> Again the same author writes: "The Iberians, a remnant of whom survives in the Basque population, are probably the most ancient people in Europe. They seem to have been the vanguard of that great migration which, from the highlands of Asia, invaded the West in successive waves. By what route they came we do not know; but they covered with their tribes the south of Gaul as far as the Garonne, perhaps even

<sup>1</sup> "Families of Speech" in *Language and Languages*, pp. 397, 398.

<sup>2</sup> *Life and Growth of Language*, pp. 258, 259.

<sup>3</sup> *Histoire de la Littérature Française*, p. 12.



to the Loire ; a great portion of Spain, to which they gave their name, the north-west coast of Italy, to the Arno, and the three largest islands in the Mediterranean.<sup>1</sup> ”

M. Moreau-Christophe assigns to the Iberians a range almost equal to that given in M. Demogeot's estimate. “ The Iberian type ” he says, “ has been strongly imprinted on the populations of southern Gaul and to this day the people of Languedoc resemble the French much less than they resemble the Catalans.”<sup>2</sup> ”

Prof. G. Gerland, in his article on the Basques and the Iberians in Groeber's encyclopædic work on Romance philology takes practically the same view, regarding the Basques as the comparatively pure remnant of the ancient inhabitants of the Iberian peninsula, many of whose characteristics, he believes, have been inherited by the modern Spaniards. The popular customs of the Basques are those of the Iberians, as described by the classical writers of Greece and Rome. Topographical names prove that they occupied not only Spain, but south-western France, and the dialect of the Gascons bears traces of the influence of their language, especially in ignoring the sounds of *f* and *v*. In fine, Prof. Gerland looks upon the Gascons as simply Romanized Basques.<sup>3</sup>

A still greater extension is given to the Iberians by such ethnologists as Prof. Rhys, Dr. Beddoe, and the Rev. Isaac Taylor. This last author writes as follows of the traces of the Iberian stock in the British Islands : “ The ethnologist readily identifies the short-statured, dark-eyed Silurian race, which is so prevalent in South Wales and the west of Ireland, with the Gascon or Basque type of the Pyrenean region. It is doubtful whether these Ligurians, Iberians, or Euskarians, as they are called, crossed into Spain by the Straits of Gibraltar, or whether they crept along the coast of the Mediterranean from Liguria and penetrated by the north-eastern defiles of the Pyrenees. The absence of Iberic names from Eastern Europe and Asia seems to make it probable that the Iberians crossed from Africa, and spread over Spain, and thence to France, the Italian coastland and the Mediterranean Islands. . . . In Aquitania proper there is hardly a single Celtic name—all are either Iberic or Romance. In Italy Iberic names are not uncommon, and it has been thought that some faint traces of a Turanian, if not an Iberic population, are perceptible in the names of Egypt, north-western Africa and Sicily.”<sup>4</sup>

The testimony thus supplied by the names of places has been confirmed by the physical characteristics of a large portion of the population of Western Europe. “ Until of late years ”, writes Dr. Beddoe, “ almost all we had to show for our belief in the existence of an Iberian substratum in our population were the conjecture of Tacitus respecting the Silures ; the length of head in the long-barrow people and some other neolithic men ; the resemblance between the Welsh cave-men and Busk's Gibraltar skulls and the supposed greater frequency of dark hair, especially in the West, than could otherwise be well accounted for. I hope to be able, in a later portion of this book, considerably to define and strengthen the evidence of physical characteristics.”<sup>5</sup> The evidence in question given in tables and charts, the result of actual personal examination, is most important, and extremely interesting. Dr. Beddoe found dark eyes and hair, the latter often curly, very frequent within the limits of Siluria. He also found dark complexions

<sup>1</sup> Hist. de la Litt. Franç., p. 11.

<sup>2</sup> Les Gaulois : Nos Aïeux, p. 30.

<sup>3</sup> Grundriss der Romanischen Philologie, vol. i.

<sup>4</sup> Words and Places, pp. 158-160.

<sup>5</sup> The Races of Britain : a Contribution to the Ethnology of Western Europe pp. 25, 26.

abounding in Dyfed and Gwyned and the other ancient divisions of Wales. In Cornwall and Devon, in Upper Galloway, Strathaven and Allendale, dark, even black, hair was often met with. It was in South Wales, however, that physiognomies strikingly Iberian or Basque-like, were most commonly observed. A comparison of Bearnese, Basque and South Wales photographs made it clear that the sitters were of the same type. In Ireland Dr. Beddoe found a preponderance of dark hair, such as occurs nowhere else in the British Isles. He also met in parts of Ireland specimens of a type still more primitive than the Iberian. One of these, which Mr. Hector McLean considered identical with the Cro-Magnon race, is also common in Spain.

The plan of Dr. Beddoe's book makes it difficult to quote from it; but no person, who would have a clear insight into the actual position of the race problem in Great Britain and Western Europe, should neglect giving it careful study. It possesses a quality not always discoverable in works of ethnology—that of trustworthiness. The author testifies only to that which he has seen and known, and the story of his tour of observation is a veritable romance of science. It is not unworthy of mention, in addressing this Section of the Royal Society of Canada, that Dr. Beddoe speaks with the utmost respect of the researches of our esteemed colleague, Dr. Daniel Wilson, whose "Prehistoric Annals of Scotland" was one of the most successful of the pioneer efforts to let in light upon the darkness which shrouded the ethnology of the British Isles.

The passages cited or referred to will give a general notion of the significance and comprehensiveness of the Basque problem, in its connection with the races of Europe. Before proceeding to discuss the relations, real and possible, between the Basques and the New World, it will be well to give an outline of their history, as far as it is known, and of the actual geography, population and condition of the Basque provinces in France and Spain.

What are known in Spain as the "Provincias Vascongadas" are three in number: Vizcaya (or Biscay), Guipuzcoa and Alava. The territory occupied by them is in the form of a triangle, bounded on the north by the Bay of Biscay, on the south by Soria, on the east by Navarre and part of France, and on the west by Santander and Burgos. The French Basque provinces include the *arrondissements* of Bayonne and Mauleon and part of Oloron. Both in Spain and France, the Basque language is spoken beyond the specified limits—the whole number of persons using it being, according to Prince L. L. Bonaparte, about 800,000, of whom 660,000 may be assigned to Spain and the remainder to France. There are also Basque-speaking communities in Mexico, Paraguay, and the Argentine Republic. The chief seaports of the French Basques are Bayonne, St. Jean de Luz, Biarritz (also a famous health and pleasure resort), Guetary and Ciboure. On the Spanish side, Fuenterrabia, from its picturesque hill, overlooks the French frontier. Following the coast westward one reaches Pasages, the city of St. Sebastian—once the centre of the whale fishery,—Zarauz, Guetaria, in a cleft of rocks sheltered by the island of St. Anton, Zumaya, Deva, Motrico, Andarroa, Lequeitio, Mundaca, Bermeo, Plencia, Portugalete, Santurce, Castro-Urdiales, Laredo, Santoña, Santander, San Vicente de la Barquera, Llanes, Rivadesella, Villaviciosa, Gijon, Candas, Luanco. These ports, which were personally visited some years ago by Mr. Clements R. Markham, lie between the French frontiers and Cabo de Peñas. The history of some of them extends back into classic times. Strabo devotes most of his third book to "Iberia," as Spain was called by the

Greeks, from Iberus, or Ebro, the river with which they were best acquainted. He, as well as Diodorus Siculus, Polybius, Appian, and other authors, also uses the term "Hispania" which was first employed, it is believed, by the Phœnicians, from the number of rabbits (*shapanim*) that they observed when they began to colonize the southern shores of the peninsula. Diodorus has anticipated the fruits of modern research or theory by applying the term "Celtiberians" to the mixed race formed by the union of the Aryan Celts with the original inhabitants. The Iberians and the Celts, he says, were long at war concerning the country to which they both had claims, but they at last agreed to occupy it in common. Having been by intermarriage fused into a single nation, they took a name which implied their double origin. Notwithstanding this clear statement, Latham is disposed to conclude that the Celts did not get much further south than the Garonne, and that the name Celtiberian indicates a general resemblance to the Celtic type rather than an actual fusion of the two races.<sup>1</sup>

The Vascones are accepted by many ethnologists as the etymological ancestors of both Basques and Gascons. M. Ferdinand Hofer, however, is inclined to assign that place to the Vaccæi, whom Diodorus characterizes as the most civilized of the neighbors of the Celtiberians.<sup>2</sup> The root of the alternative term, "Euskarian," may be found, perhaps, in the Ausci (the *Αὔσσιοι* of Strabo).<sup>3</sup>

Some of the qualities and customs attributed to the Iberians and Celtiberians by Strabo, Diodorus, Appian, and other writers, are still met with among the Basques. Among these may be mentioned the communal land system, the law of primogeniture without regard to sex, the employment of women in field labor, and the peculiar ceremony known as the *couvade*. As to this last custom, indeed, M. Jules Vinson, who is a foremost authority on all Basque questions, denies that any modern traveller has discovered it in the Basque provinces. The only basis for the belief in its existence is, he maintains, a passage in Strabo,<sup>4</sup> which has not been proved to refer to the ancestors of the Basques, and some allusions in modern works. These allusions always relate to the people of Bearn, from whose dialect the word *couvade* is borrowed. On the other hand, Lafitau, in his famous treatise, in calling attention to certain special points of resemblance between the manners of new-world and old-world nations, writes as follows: "Such for example, is the custom prevailing in certain communities which obliges the husband to take to his bed when the time for the wife's *accouchement* has arrived and to be there tended by the latter, with all the care usually expended on such occasions on the mother of the child. For although this was a religious custom, it was nevertheless a very peculiar one. Now, I have found it among the Iberians, who were the earliest inhabitants of Spain and also among the first occupants of the island of Corsica, as well as among the Tibarenians of Asia. It also prevails in our own time in some of our provinces bordering on Spain, where the proceeding is termed *faire couvade*. This same usage is found among the Japanese and among the Caribs and Galibis of America."<sup>5</sup> And as to its survival, in remote districts of the Pyrenean provinces, even to the present day, M. Eugène Cordier, as the result of personal enquiries, learned that, although it had fallen into discredit, it

<sup>1</sup> Ethnology of the British Colonies, p. 24.

<sup>2</sup> Bibliotheca Historica, v. 34.

<sup>3</sup> Geographica, iv. 2, pp. C. 190, 191.

<sup>4</sup> Geogr. iii. 4, p. C. 165.

<sup>5</sup> Mœurs des Sauvages Américains comparées aux mœurs des premiers temps, i. 49, 50.

was still occasionally practised by old-fashioned people in out-of-the-way localities. It is now generally regarded as a symbolic recognition and acknowledgment of paternity.

The difference of opinion just noted may be taken as an illustration of the divergence of view which characterizes the discussion of every subject connected with the Basques. The controversy is not so much like a pitched battle in which two contending hosts strive with each other for the victory, as an Ishmaelite warfare in which every man's hand is against his neighbor. Even the identity of the Basques with the Iberians is disputed by M. Vinson as a theory which has no foundation in fact—the very term Iberian being, he insists, a vague, indefinite expression of which the meaning is obscure. On that point, however, the weight of manifold testimony is overwhelmingly against M. Vinson. It is true that, with respect to the language spoken by the Iberians, we are still sadly in the dark. The inscriptions which pass for Iberian or Celtiberian do not readily admit of interpretation by means of Basque. According to Canon Taylor, the alphabets known as Gaulish and Iberian were due to the Greek colonists of Massilia and Emporia. M. Vinson says that they are manifestly of Phœnician origin. Doubtless they would be so ultimately in any case, but that in a country where the Phœnicians played for centuries so important a part, there should be some such trace of Tyrian or Sidonian, as well as of Carthaginian influence, was only to be expected. Besides, at the remote date when the colonies above mentioned were founded, the Greek characters were hardly distinguishable from their Cadmean prototypes.

There is, indeed, no direct proof that the Basques are a surviving relic of a far-speaking Iberian race, the pre-Celtic occupant of nearly all Western Europe. But the circumstantial evidence is of considerable value. Long since, Wilhelm von Humboldt drew attention to the prevalence of what he deemed to be Euskarian elements in the geographical names of eastern and northern Spain, which became mixed with Celtic in the Celtiberian region and wholly Celtic where the Iberians had been thrust out or absorbed by the intruders. Among such elements are *asta* (a rock), as in Asturias, Astorga, etc ; *ura* (water) as in Iluria, Verurium ; *ituria* (a fountain), as in Iturissa, Turiaso, etc. *Pa*, *etani*, *etania*, *gis*, *ilia* and *ula*, are among the most frequent Euskarian terminations, while the initial syllables most commonly met with are *al*, *ar*, *as*, *bae*, *bi*, *bar*, *ber*, *cal*, *ner*, *sal*, *si*, *tai* and *tu*.

Now, if along with the evidence, afforded as well by local names as physical characteristics, of the presence in Western Europe and especially in the Iberian peninsula of a pre-Celtic race of Basque affinities, it could be shown that any of the Celtic dialects bore traces of Iberian intermixture, the proof of the Iberic theory would be, if not complete, at least considerably strengthened. On this point Dr. Beddoe writes : " Anthropologists have long been awaiting the appearance of some philologist fully qualified to determine the important problem whether there be really Euskarian and Iberian elements in the Cymric language, or, if so, whether it be equally or more potent in the Gaelic and Erse. The existence of such an element had been boldly ascribed and superciliously denied or ignored until recently Professor Rhys has answered our call with the assurance that the element which physical phenomena have led us to look for does really exist, and that it is to be found in Gaelic rather than Kymric, and in Pictish rather than in Gaelic ; and that the Iberian symptoms among the Silures must be accounted for by their having been in part, at least, Gaelic before they became Kymric in language. Professor Rhys's opinion

is clear and consistent, and may be reconciled with physical facts better than any other hypothesis on the subject.<sup>1</sup>

The discovery, alluded to in the passage just quoted, of the presence of an Euskarian element in the Pictish language, has led Prof. Rhys in his "Celtic Britain" to pronounce the Pictish people not Celtic, but the pre-Celtic aboriginal inhabitants of Northern Britain, their language having been derived from the same source as the Basque.<sup>2</sup> The Dicalidonæ of Ammianus Marcellinus (probably equivalent to the Doucealedonios of Ptolemy) would, in that case, indicate the union of the Picts and Celts, acting against a common foe.

The resemblance to "Iberia" of "Ivernia" (Hibernia, Ierne, Erin) has not escaped notice. The eponymous ancestor of the race has likewise a variety of names, Heber, Eber, Emer, Ier, Ir (as in Ireland) and Er (a name which occurs in Plato, though in a different connection).<sup>3</sup>

Heber (the Iberian) and Eremon (the ploughman) may indeed indicate in legendary language the twofold origin of the Ibero-Celtic tribes. Such wordy analogies may, however, lead to devious and uncertain paths.<sup>4</sup> Nor, indeed, is it necessary to go in quest of this kind of evidence for a theory which has the support of Latham, Figuiet, Dr Beddoe, Prof. Huxley, Prof. Rhys, M. Broca, M. Girard de Rialle, M. Raymond, Prof. Winchell, H. Hale and others of our foremost ethnologists. We may conclude, therefore, with M. Raymond, that the earliest inhabitants of the Iberian peninsula were the Iberians; that from their fusion with the invading Celts were formed the Celt-Iberians, and that the Basques, Vascons, or Euscaldunac (those who have speech) are the purest extant type of that ancient stock. Even if we admit with M. Vinson that the theory thus formulated has not been established on an unassailable scientific basis, it may, at least, be accepted as the best working hypothesis that has yet been framed.

I find unexpected confirmation of this hypothesis in a work which antedates the years of scientific philology. In a note to the once famous "Dissertation sur l'Origine des Peuples Celtes et sur leurs Anciennes Demeures," of Jean Daniel Schoepflin, inserted in Vol. IV of Pelloutier's still more famous "Histoire des Celtes," p. 283, the author writes: "Even at the present day there are found within the confines of France, the remains of three ancient languages of Gaul. The Bas-Breton represents the ancient Celtic. The Cantabrian is extant, not only in the cantons of Spain, formerly occupied by the Cantabrians or the ancient Gascons, but even from the district of Soule, under French domination, to Bayonne, on the other side of the Pyrenees. The French call those who use that language

<sup>1</sup> The Races of Britain, p. 26.

<sup>2</sup> Celtic Britain, pp. 265, 270.

<sup>3</sup> Rep. x. 13, p. 614.

<sup>4</sup> In the strikingly characteristic account of the shipwreck in *L'Homme qui Rit*, Victor Hugo falls into the mistake of making a Basque woman and an Irish woman understand each other's speech. The Irish woman is, represented as repeating the Lord's Prayer in Gaelic, after the outlawed scholar's recitation in Latin, and, her Basque companion in misfortune is made to comprehend the words. Possibly Hugo, who does not seem to have troubled himself much with questions of philology, was misled by the chance resemblance between the Irish *atair* and the Basque *aita*, in the opening clause of the Lord's Prayer. Such similarities are frequently met with. In Cahita, a Mexican dialect, *atzai* is the word for "father," which, again, is *aize* in a Mosquito dialect. In one of the Friesian Islands *tâte* has the same signification, while *tata*, *totic* and *tautah* are synonymous words in some languages of Central America and the Isthmus of Darien. Max Müller's *Science of Language*, i. 59; Bancroft's *Native Races of the Pacific States*, iii. 710, 746, 763 and 794. See also, for other such correspondences, Wilson's *Prehistoric Man*, ii. 372, 378.

Basques or Biscayans. (Mariana de Reb. Hispan, lib. I, cap. 5. Brietius in Hispan. Veter., p. 249). Joseph Scaliger characterizes this tongue as neither barbarous nor difficult, but smooth and pleasant in enunciation. He considers it extremely ancient and believes that it was in use in the country where it is spoken before the time of the Romans. The same Scaliger, in a letter to Paul Merula, which appears in the 'Cosmographie' of the latter, reckons the Cantabrian or Basque among the seven minor mother tongues of Europe. He recognizes only four great families of speech." Pelloutier wrote before the "discovery of Sanscrit" (Farrar, Language and Languages p. 292); but, without intending it, he anticipated M. Pictet in proving the right of Celtic to a place in the Aryan household.

One of the earliest treatises which sets forth the claims of the Basque to consideration, is a volume of dialogues, in which *la Lengua Cantabra Bascongada* is introduced in the character of a venerable matron, who complains that her own children have forgotten her and bestowed upon rival strangers the attentions due to her as Spain's ancient mother tongue. It is not unworthy of note that this early fruit of Basque patriotism ripened in the soil of the New World, the book having been written and published in Mexico in 1607, just a year before the foundation of Quebec. In 1808 an essay on the Basque language was printed at Bayonne, the author of which, Abbé Diharec de Bidassouet, was, according to the title page, *sauvage d'origine*.

A new era in the study of Basque was inaugurated by the publication (1817-1821) of the inquiries of W. von Humboldt into the affinities of the Basque language. He spent a considerable time among the different communities where it was spoken and mastered the several dialects. He was the first to apply the test of topographical nomenclature to the Iberian theory; and the result of his investigations was the conviction that Basque was the ancient speech, not only of the peninsula, but of the adjoining islands. One of the most earnest of modern students of Basque is Prince L. L. Bonaparte, who has published a series of works bearing on the whole range of Basque philology and grammar.

Other scholars who merit special mention for their contributions to the literature of the subject are Abbé Darrigol, Dr. Mahn, M. Antoine d'Abbadie, M. Ribary, M. Gallatin, M. H. de Charency and M. Julien Vinson. The three last gentlemen are among the comparatively few who have investigated the relations between Basque and the languages of America. Mr. Gallatin's paper on the analogies between Basque and the languages of America and of the Congo appeared among the Smithsonian Contributions to Knowledge for 1856. In 1867 appeared a short treatise, from M. de Charency's pen, entitled "*Des Affinités de la Langue Basque avec les Idiomes du Nouveau-Monde*." M. Vinson's extremely interesting and carefully reasoned essay, "*Les Basques et les Langues Américaines*," was printed in the *Compte-Rendu* of the first meeting of the *Congrès International des Américanistes* at Nancy, in 1875. Two years later, M. Vinson gave to Western Europe a French version of the essay on the Basque language written in Hungarian by Professor Francis Ribary, of the University of Pesth, with an introduction and notes by the translator. To this admirable work (Paris: T. Vieweg) I am indebted for a great deal of welcome information. From the Preface I learn that a sort of Basque *Eisteddfodd* has been instituted at Sare, in the very heart of the Basque country, through the generosity of Messrs. Antoine d'Abbadie and Amédée de Laborde-Noguez, who offer prizes for poetry. According to Strabo (p. C. 139) the art was diligently cultivated by the fathers of the race, some of whom had poems and versified laws of great age (or of great length, according to

another reading). The Cantabrians, according to the same author, had such fortitude and such a fondness for their national songs, that they recited them even amidst the cruel tortures inflicted on them by their Roman victors. One such composition, or what purports to be such, has been saved from oblivion. The following is a translation of M. Ampère's French version of it :—

## I.

They come, they come, the hosts of Rome,  
To lay the pride of Biscay low,  
But hill and plain repeat the strain :  
" Biscayans yield not to the foe."

## II.

Let Cæsar rule the slavish fool  
Who bows beneath his despot sway,  
Lecobidi's the king for me,  
No Basque to Rome will tribute pay.

## III.

To arms ! to arms ! Behold ! The swarms  
Of Roman hirelings hedge us in !  
By sea and land their power withstand !  
Strike for Biscaya ! Strike and win !

## IV.

Let them regain their native plain,  
Far from the towering Pyrenees ;  
Where forests crown our fortress town,  
Our home is with the mountain breeze.

## V.

Choose well your ground ; look well around ;  
Unarmored limbs are strong and fleet ;  
With shield and lance well-poised advance  
And Rome's mailed squadrons boldly meet.

## VI.

What though alway, by night and day  
The siege has lasted five years long ;  
Fifteen to one, their dead atone  
For those sad years of cruel wrong.

## VII.

Yes, though 'tis true that we were few  
And they a mighty multitude,  
The danger's past, we've won at last,  
And Biscay still is unsubdued.



This song was discovered, it is said, in 1590, by Ibanez de Ibarguen, and first published in 1817 by W. von Humboldt in "Mithridates." M. Jules Vinson does not believe that the song above translated is of an earlier date than the sixteenth century. The earliest extant specimens of the Basque language do not, in his opinion, take us further back than the fifteenth century. In poetic merit the foregoing effusion may be compared with some of the songs in Dr. Brinton's "Ancient Nahuatl Poetry." It might also be matched by productions attributed to our own Northern Indians. Whether such productions are the unaided offspring of the aboriginal muse, I cannot affirm with confidence.

I have already cited certain hints rather than express assertions to the intent that some of the latter and the Basque may have descended from common forefathers. Such a theory implies either intercourse in remote times between both sides of the Atlantic or some catastrophe such as that of which the Atlantis legend is supposed to preserve the tradition. Prof. Alexander Winchell, in his remarkable work, "Preadamites," would uphold the existence in prehistoric ages, not merely of Atlantis, but of a still more primitive continent in the Indian Ocean. His hypothesis is that the original abode of mankind was a region covering the site of the islands of Mauritius and Reunion and the surrounding waters, to which has been given the imaginary name of "Lemuria." If we were disposed to be satirical, we might attribute this name to the ghostly and unsubstantial nature of the theory which invented it. It is, however, not in Roman mythology, but in zoology that we must look for its derivation. The Lemuridæ, a group of lowly organized and very ancient creatures—though still discoverable over a wide area—exist nowhere else in so great abundance as in the island of Madagascar. On this fact and on certain peculiarities in the bird fauna of that island, Dr. Hartlaub and other naturalists have based the theory of a Lemurian continent. Mr. Alfred Russel Wallace, though he does not recognize the necessity for such a continent, admits the possibility of the former existence of several large islands between Madagascar and India. Prof. Winchell, however, accepts Lemuria as, at least, probable, and in his chart of the gradual dispersion of mankind, he makes it his starting-point. One branch of the prehistoric pre-Mongoloids he supposes to have traversed Northern Africa as far as the ocean, where a portion of it crossed into Europe by what was then an isthmus. They found a paradisiacal peninsula south of the Pyrenees and retained it long as a favorite centre of population, founding there an "Iberian Empire." The remainder of those Mongolians made their way to Atlantis, to the actual existence of which, Dr. Winchell says, recent explorations, including the soundings of the *Challenger*, the *Gettysburg* and the *Gazelle*, representing England, the United States and Germany, respectively, have given substance and reality. "During the historic period", writes Prof. Winchell, "the isolated Canaries have stood as the only inhabited remnants of Atlantis; and the detached and degenerate Guanches, when at length rediscovered, complained: 'God placed us on these islands and then forsook and forgot us.'" Two years after the publication of "Preadamites" appeared Mr. Ignatius Donnelly's "Atlantis: the Antediluvian world" a work whose sweeping statements and wild comparisons of unrelated races and languages have tended, among men of science, to discredit rather than to commend the theory. At the same time, it revived discussion on a question which many persons had imagined to be set at rest for ever, and elicited from various pens whatever could be said on one side or the other in the controversy. Shortly before its appearance, Mr. R. W. Boodle, in the *Educational Record* of the Province



of Quebec, of which he was editor, traced, in a learned and readable paper, the origin, development and decline of the story from the days of Plato to the present. He aptly concludes with a quotation from the great Platonist, Dr. Jowett, who regards it as a pure fabrication. Between this view, however, and its acceptance as a narrative of events, which actually took place in a region that once had real existence, there may be several degrees of assent or rejection. Along with "fanciful amplifications" of his own invention, Plato may, in the "Timæus" and "Critias," have given expression to a vague tradition of knowledge, once current in ancient Europe, of a trans-Atlantic country and people. This is the reasonable view adopted by Dr. Wilson in his paper on "The Lost Atlantis," presented two years ago to this Section of the Royal Society. "It forms", writes our distinguished colleague, "one of the indisputable facts of ancient history that, long before Greece became the world's intellectual leader, the eastern Mediterranean was settled by maritime races, whose adventurous enterprise led them to navigate the Atlantic. There was no greater impediment to such adventurous mariners crossing the Atlantic in earliest centuries before Christ, than at any subsequent date prior to the revival of navigation in the fifteenth century." If this view be admitted, there is no reason why some of the Iberians may not have crossed to these shores ages before the Romans had anything to do with Spain, and the resemblances in structure between the speech of the Basques and some of the tongues spoken on this continent, may find their explanation in the fact that those who use them are descendants of the same primitive stock. In that case the Basque fishermen who made their way in the fifteenth, perhaps the fourteenth, century to these shores were exemplifying the truth of the adage that blood is thicker than water. This is the theory of Mr. Horatio Hale, who in his delightfully instructive treatise, "The Iroquois Book of Rites," maintains that the early Europeans, of whom the Basques are the sole survivors who have retained their original language, may have been of the same stock as the Huron-Iroquois of the lower St. Lawrence. Mr. Hale has found confirmation for his argument in Sir William Dawson's "Fossil Men", where the relics of ancient human habitation in America are compared with similar finds in Europe. The preparation of the work was prompted by the discovery, in 1861, of the remains of the ancient town of Hochelaga, which had disappeared from sight for some three centuries and to the identification of which the record of Jacques Cartier's visit was the only guide. On the basis of that identification (but for which an endless controversy might have raged over the fossils in question), the author, "arguing from the known to the unknown, undertook to illustrate the characters and condition of prehistoric men in Europe by those of the American races." It so happens that among the prehistoric races of Europe with which, in "Fossil Men", some of our American tribes are brought into comparison, are those which form the subject of the epoch-making "*Reliquiæ Aquitanicæ*." "What," asks Sir William Dawson, "could the old man of Cro-Magnon have told us had we been able to sit by his hearth and listen understandingly to his speech, which, if we may judge from the form of his palate bones, must have resembled more that of the Americans or Mongolians than of any modern European people." But the old man of Cro-Magnon lived in the very region in which the Iberian or Aquitanian ancestors of the Basques (for whose language the very same claim is made to-day) dwelt in classical times. Moreover M. Hamy met with the same Cro-Magnon type among the Basque skulls of Zoraus. M. de Quatrefages also met with living specimens of it, and M. Louis Figuier,

who classes it with the Mongolian family, says that it still exists in the Basques as well as in the Indians of North America.

In an essay on "Indian Migrations, as evidenced by Language", read at the Montreal Meeting of the American Association for the Advancement of Science, Mr. Hale cites Sir William Dawson's work as confirming his belief in the kinship between the Iberians and the Americans. "It will be noticed", he writes, "that the evidence of language and to some extent of tradition leads to the conclusion that the course of migration of the Indian tribes has been from the Atlantic coast westward and southward. The Huron-Iroquois tribes had their pristine seat on the lower St. Lawrence. The traditions of the Algonquin seem to point to Hudson Bay and the coast of Labrador. The Dakota stock had its older branch east of the Alleghanies, and possibly (if the Catawba nation shall be proved to be of that stock) on the Carolina coast. Philologists are well aware that there is nothing in the language of the American Indians to favor the conjecture (for it is nothing else) which derives the race from eastern Asia, but in western Europe one community is known to exist, speaking a language which in its general structure manifests a near likeness to the Indian tongue. Alone of all the races of the old continent, the Basques or Euskarians of northern Spain and south-western France have a speech of that highly complex and polysynthetic character which distinguishes the American languages. There is not, indeed, any such positive similarity, in words or grammar, as would prove a direct affiliation. The likeness is merely in the general cast and mould of speech; but this likeness is so marked as to have awakened much attention. If the scholars who have noticed it had been aware of the facts now adduced with regard to the course of migration on this continent, they would probably have been led to the conclusion that this similarity in the type of speech was an evidence of the unity of race. There seems reason to believe that Europe, at least in its central and western portions, was occupied in early times by a race having many of the characteristics, physical and mental, of the American aborigines. The evidences which lead to this conclusion are well set forth in Dr. Dawson's recent work on Fossil Men. Of this early European people, by some called the Iberian race who were ultimately overwhelmed by the Aryan emigrants from central Asia, the Basques are the only survivors that have retained their original language; but all the nations of southern Europe, commencing with the Greeks, show in their physical and mental traits a large intermixture of this aboriginal race. As we advance westward, the evidence of this infusion becomes stronger, until in the Celts of France and the British islands, it gives the predominant cast to the character of the people.<sup>1</sup>"

Mr. Hale goes on to say that this theory alone accounts for the marked contrast between the Aryans of the East and those of the West,—the former being submissive, while with the latter, especially where the so-called Celts predominate, "love of freedom is a passion."<sup>2</sup>

From the passage above quoted it will be seen that Mr. Hale's theory does not depend for proof on any discovered verbal similitude between Basque and any form of American speech. How vain such comparisons are, it is almost needless to point out. Chance coincidences of sound occur in languages that cannot possibly have any relationship, and even

<sup>1</sup> Note F, Appendix to the Iroquois Book of Rites, pp. 187, 188.

<sup>2</sup> On this point Mr. Hale's argument is hardly convincing. It is among the fairer northern races in which, the Iberian element is small, that love of independence abounds most.

in our own language, how many words which can be easily traced to a common ancestor have no family likeness whatever.<sup>1</sup>

M. Jules Vinson who has devoted an elaborate paper to the examination of the relations between the Basque and the American tongues (especially the Algonquin and Iroquois) fails to recognize any real kinship between them. He acknowledges that, in the formation of compound words, the Basque has a process of syncopated incorporation, which resembles that of the American languages, and in an ascending series, in the order of agglomerative capacity, he places the Basque next to the American family. The order of his enumeration is as follows:—the Dravidian group, very poor in forms; the Altaic, which has begun to incorporate; the Basque (M. Vinson rejects the term "Iberian" as of

<sup>1</sup> Whoever takes the trouble, may discover even in English many instances of words which, though having scant, if any, resemblance to each other, are known to be descended from common ancestors. Of such words are *plush* and *wig*, *couch* and *locate*, *pilgrim* and *agrarian*, *vamp* and *pedestrian*, *nice* and *science*, *daub* and *alb*, *bugle* and *beef*. If, crossing the boundaries of our own language, we wander through the extended domain of Aryan speech, we find such instances in still greater abundance. Prof. Max Müller mentions as an illustration of phonetic corruption the gradual transformation of *duhitar* (daughter) or some such form, into the Bohemian *dei*, and of *svasar* (sister) into the Pehlvi *cho*. He points out the identity of the French *même* with the Low Latin *semetipsis-simus*, and shows that *tear* and *larme* spring from a common far-off source. These instances might be indefinitely multiplied. But for the existence of written literatures, it would be virtually impossible to verify such etymologies; and, judging by analogy, we may reasonably conclude that changes at least not less noteworthy have overtaken the words of unlettered languages, originally akin, after being separated for centuries or even millenniums by continents or oceans. "We have reason to believe," writes Prof. Max Müller, "that the same changes take place with even greater violence and rapidity in the dialects of savage tribes, although, in the absence of a written literature, it is extremely difficult to obtain trustworthy information. But in the few instances where careful observations have been made on this interesting subject, it has been found that among the wild and illiterate tribes of Siberia, Africa and Siam, two or three generations are sufficient to change the whole aspect of their dialects." Now, while avoiding the mistake of denying any stability to our aboriginal tongues—a mistake which would be corrected by the ascertained general identity of the Huron-Iroquois and Algonquin of the early explorers with those languages as they exist to-day—we cannot dispute the fact that, like those dialects of the Old World to which Prof. Müller refers in the passage just quoted, those of our own Indians are susceptible of constant modification which in the course of time would render unrecognizable the relationship between forms of speech that may have been formerly allied. This would be especially the case where circumstances had crowded a number of disparate tribes, speaking diverse tongues, into a limited area, such as gathered around the trading posts of the Hudson's Bay Company on the Pacific coast. In the Chinook jargon of that region we have ample illustration of the disguises that a language may assume on unaccustomed lips. An Englishman there figures as *Kint-shosh* (King George); *oluman* serves to designate an elderly person and is also used as an adjective; *tumola* is "to-morrow." *Pos* (suppose) means "if" or "provided that"; *pe* (french *puis*) is "and" as well as "then"; for "to run" the word is *kuli* (*courir*); *sawash* (*sauvage*) is the usual term for an Indian. *Lasuai hakatchum* is the Chinook for a "silk handkerchief"—the former of the two words being evidently a corruption of the french *la soie*. *Paia* is intended for "fire"; *ilai* for "dry"; *litan* for *les dents* (the teeth); *lamestin* for *la médecine*, while *clak-hah-ahyah* does duty as "how do you do?" This last phrase "is believed to have originated from their hearing one of the residents at the fort, named Clark, frequently addressed by his friends: "Clark, how are you?" (Wilson's Prehistoric Man, ii. 336). This system of complex speech had been in vogue already (though, without its French and English constituents) before Europeans came in contact with the tribes of the Pacific coast, and we may, therefore, conjecture to what influences language may have been subjected in the course of long preceding generations. How hopeless, then, in the presence of the possibilities thus implied, is any comparison between American and old-world languages based on similarity of spelling or sound, if such likeness were discoverable! But, on the other hand, the absence of verbal resemblance cannot justly be accepted as sufficient to refute a theory of affinity which is strongly supported by structural analogies. On this point, with special reference to the Basque-American controversy, Sir Daniel Wilson, while admitting that this element of correspondence (that is the general likeness in cast and mould of speech indicated by Mr. Hale) "is sufficiently marked to attract much attention," has come to the following rational conclusion: "We have as yet, however, barely reached the threshold of this all-important inquiry; and find at every step only fresh evidence of the necessity for the diligent accu-

vague significance), fully incorporative and tending to polysynthetism, and the American group, completely polysynthetic.<sup>1</sup>

On the other hand, the view espoused by Mr. Hale has found an enthusiastic advocate in the Count de Charency. "We would be inclined to believe", he says, "that America was peopled from the side of the Atlantic at an epoch when western Europe was still occupied by populations of the Iberian race." And one of the grounds on which he bases that conclusion is that the American languages, while showing no signs of relationship with Asiatic forms of speech, present features of remarkable resemblance to the Basque of the present day, especially in grammatical structure. The Count de Charency thinks, moreover, that it is in the dialects peculiar to Canada that the most marked affinities with the Basque language have been discovered.<sup>2</sup>

Commenting on these alleged evidences of kinship between the languages of Canada and the oldest tongue of Europe, Abbé Cuoq very pertinently remarks that, since even a comparatively meagre inquiry has elicited discoveries of such great interest and significance, there is all the more reason why philologists on both sides of the Atlantic, but especially those who have opportunities of intercourse with our Indians, should carefully examine all the peculiarities of the aboriginal languages and dialects, so that their investigations, combined with those of the students of Basque, may bring fresh and still fresher facts to light, until finally the question of Basque-American affinity has received an authoritative solution either in the affirmative or the negative. The advice is worthy of the moderation and good sense of one of the most laborious and fruitful students of American philology.

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mulation of all available materials before the native races of our own Dominion and those of the neighboring States perish, and their languages pass beyond recall." The paper in which these words occur, the Huron-Iroquois of Canada, a Typical Race of American Aborigines, Trans. Roy. Soc. Can. 1884, the closing chapter of Prehistoric Man, 3rd edition, H. Hale's Iroquois Book of Rites, and essay on Indian Migrations as evidenced by Language, M. Jules Vinson's translations of Ribary's Essay on the Basque Language, and his paper, Le Basque et les Langues Américaines (Compte-Rendu du Congrès International des Américanistes, 1875), the Iroquois and Algonquin Lexicons, the Etudes Philologiques and Jugement Erroné, of our colleague, Abbé Cuoq, may be profitably consulted on the whole subject of Basque-American affinities. In concluding this long note, I would say that, while in the main agreeing with Mr. Hale ("Race and Language," in *Popular Science Monthly*, January, 1888) as to the great importance of speech as evidence of the stock to which those using it belong, I would also give due weight to traditions, religious notions, folklore, cranial formation, complexion, stature and other physical and moral characteristics.

<sup>1</sup> Le Basque et les Langues Américaines in the *Compte-Rendu* of the Congrès des Américanistes, Nancy, 1875, ii. 79.

<sup>2</sup> See Appendix for illustrative specimens of Basque, Iroquois and Algonquin.

## APPENDIX.

SPECIMENS OF BASQUE, IROQUOIS AND ALGONQUIN.

*Parable of the Prodigal Son.*

S. LUKE, XV 11-32.

## BASQUE.

11. Halabér errán sesán: Gizón baték sítuen bi semé.
12. Éta hetarik gastenák errán siezon aitarí: Aitá indak onhassunetik niri elcen zaitadán partéa. Éta partí siecen onák.
13. Éta egún gutirén buruän, gusiák bildurík semé gaztenór, joán sedín herri urrún batotára, éta hán irion sesán beré onhassuna, piódigohi visí isané.
14. Gusiá despendatú ukan zueneán, egín izán zen gosseté gogorbát herri hartán éta hurá has sedín behár izáten.
15. Éta joaník lekú hartáko burgés batekin jár sedín, éta hárk igór sesán beré possessionetára urdén baskacéra.
16. Éta desír zuen urdik játen zúten maginkhetarik beré sabelarén béthacera, éta nehórk ecedaukan emaiten.
17. Éta beré buruári ohárt sekioneán errán sesán: Sembát alokasér díradén ené aitarén eceán ogiá frankó duteník, éta ni gosséz hílcen bainaíz.
18. Jaikirík joánen naíz neuré aitaganá, éta erránen daukat: Aitá húts díot seruärén contra, éta hiré aicineán.
19. Éta gehiagorík eznaíz digné hiré semé deíceko: egín nézak euré alokaseretarík bát bezalá.
20. Jaikirík, badá ethór sedín beré aitaganá. Éta hurá oraíno urrún zelá, ikús sesán beré aíták, éta kompassionné har sesán, éta láster eginík egóc sesán beré buruü, éta pot egín síeson.
21. Éta errán síeson semeak: Aitá húts egín díot seruärén contra éta hiré aicineán, éta gehiagorík eznaíz digné hiré semé deíceko.
22. Orduán errán síesen aíták bere sérbicariei: Ekarzúe arropá prinsipaléna, éta jaúnz ezazúe éta emázue erhaztubát bere eskúra, éta sapaták ojnetára.
23. Éta ekarririk arecé gisená, hil ezazúte, éta jaten dugulá, atsegín har dezagún.
24. Ésen ené semé haur hil zen, éta hársara vístu da, galdú zen, éta eriden da. Éta has sitesen atsegín hárcen.
25. Éta zen arén semé saharrená landán, éta ethór zelá ecearí urbildú zajonéan, ensún zicán melodiá, éta dansák.
26. Éta deithurík serbicarietarík bát, interroga sesan ser zen.
27. Éta árck errán síeson, hire anaje etorri ízan da, éta hil ukán da hiré aíták arecé gisembát, serén ossorík hura esebítú zúen.
28. Éta asserré sedín: éta ezén sartú nahi izán, beré aíták badá elkirík othoíc egín síeson.
29. Bainá árck ihardésten zuelá errán síeson beré aitarí: Huná hambát urthedík serbicácen audalá, éta egundano hirí manurík eztíot iragan, éta egundano pitinabát ezdaukak emán neuré adiskidehín atsegín hárceko.
30. Bainá hiré semé haúr, seinék iretsi baitú hiré onhassún gusiá putekín, etorri izán deneán, hil ukán daukak huni arecé gisená.
31. Semé hi bethí enekín aiz (séra) éta ene (gusia hiré da).
32. Éta atsegín hartú behár zuén, éta allegeratú, serén hiré anaje hil baicén, éta vistú baitú, galdú baicén éta eriden baitú.

## IROQUOIS.

11. Saiatat ne ronkwe tekeni tehowiraientakwe tenitsinn.
12. Nene kenniraha wahawenhase ne roniha, wahrenron : rakeni, askon onen tsinikon n'akawenk tsini kaien ne kento. Wathaiake kati ne rokstenha nok wahaon ne roienha n'ahaiatentane.
13. Iahte iaonnisehon saharoroke tsini hoiën, nok wahahtenti, inon niahare akoren tienakere, nok eh iahatiesatanion tsini howistaien, iahte konttokha wakontekwisa.
14. Kawennio wahakwentane akwekon, wahontonkariake n'akwah n'ehtienakere, nok wahotentane wathatonnhakari.
15. Waresakha kati n'ahonwannhane ; ronkwe rokwatsehne wahonnhane, iahotenniete tsi thaonwentsiaientakwe, tasakosnieke ne kwiskwis ronaskwakatekwe.
16. Raskanekskwe ne arake ne iotikwihon ne kwiskwis, nok iah onka to honwawiskwe.
17. Wathaterientharen kati n'aonsahonikonrote, wahrenron : oh ! toni kentiohkwa ronnhatseraien rakeniha raononskon, tiotkon nennee ronahton, ok nii ken kiteron, katonkariaks onwe, skanoron akiheie.
18. Enskahtenti kati, enshiatisakha ne rakeniha, enkiron : rakeni, rinikonraksaton ne Rawennio, nok oni nise konnikonraksaton.
19. Iahte sewakerihonte n'aonsaskienhahake ; nok arahonne ethonaskierase tsini sheierhase ne sannhatsera okon.
20. Iokontatie kati tontahahtenti, tontahoiatisakha ne roniha. Sekon inonha itres, wahotkatho ne roniha, nok wahotenre raonikonhrakon, iatharatate, iathoteratana, ok sire wahoniasa nok wathonoronkwanioton.
21. Ethone takenron ne roienha : rakeni, rinikonraksaton ne Rawennio, nok konnikonhraksaton oni nise, iahte sewakerihonte n'aonsaskienhahake.
22. Ok eken ne roniha wasakawenhase ne raonnhatsera : oksa, wahrenron, kasewaha n'akwah atiatawitserii n'ahatiatawite ne rienha, satsisewasnonawit wennisnonsawitseranoron, tonsatsisewatha oni ne wahtakwiios.
23. Sewesak oni ne ioresen teionnhonskwaron kenniakaha, sewario taetewatskaon akwah aetewatekhonni ;
24. Aseken ne ken rienha rawenheionne nok shotonnheton, rotiatatonhonne nok shiitatsenrionhatie. Ethone wahontasawen n'ahontekhonni.
25. Ken kaien ne rakowanen ne roienha kahetake iereskwe ; tsatontahawenontonhatie, toha sonsarawe tsi rotinonsote, wahatieren ok, iakoterennotatie, iakohonrawatonhatie oni.
26. Tahononke ne ronwannhas, nok wahoriwanontonse ohniiotieren.
27. Tahorori kati, wahrenron : hetsekenha sarawe, nok wahario hianiha ne kenniaka hateionnhonskwaron, aseken skennen sahokatho.
28. Tsiniot ne tahonakwen ne rakowanen tsi wahotokense, nok iahte hatontatskwe n'ahataweiate ne kanonskon. Tahaiakenne kati he roniha nok wathorhotonnionse.
29. Ok eken takenron ne roienha : onen eso ioserake si konhietense, iah oni nonwenton te konwennontion, nok iah nonwenton teskatewentetase skaiatat oni nonkwatsenen, ne taiakwatonte nonkwatenro naiakwatowesen.
30. Ken kati kaien hetsienha, kawennio rokwentaoen ne raowenk, iahte konttokha satehonatekwison, sarawe ne kento, oksaok waserii ne ioresen teionnhonskwaron.
31. Nok tontakenron ne roniha : kien, tiotkon wahi tenikwekon, akwekon sawenk tsinikon nakawenk ;
32. Ioteriwisonhonne naiontonwesen aiontekxonni oni, aseken ne ken hetsekenha rawenheionne nok shotonnheton, raiaatatonhonne nok sahoketote.

## ALGONQUIN.

11. Pejik anicinabe nijinigoban o kwisisà.
12. Egacinjinidjin ot igon: n'ose, mijicin inikik enenindagwak kitei tibenindamân. Mi dac keget i nenawinamawâte o kwisisà inikik ke tatibenindaminite.
13. Kagwete kinwenj apite, o ki mawandjiton egacinjite minikik ka tibenindamoninte, migote i madjâte wasa ij ijâte; mi dac indaje i wanadjitwatizote kakina kekon tebenindamogobanen kiwanisiwining ij inadjihitizote.
14. Ka wanadjitote kakina, wanina ki pakatenaniwan endajikete, midac i mādji kotakitote.
15. Ka madjâte kitei nanda anokitagete, pejik anicinaben endanakinigobanen ot anonigon, kijatakimikiwaming ot asigon kitei ganawenimâte kokocà.
16. Epite wi wisinigobanen, o misawenindamawa ejisininite kokocà, kekona gaie nin ki ondji kiepoiânân, inenindam; sakitawa dac eji midjinite kokocà, kawin awian o papamitagosin kitei ijsinipan.
17. Keg apite mekawingin togoban, mi dac ij ikitote: aninitok endateiwagwen anotaganak n'osan endanite, o maneawà pakwejjiganà, nin dac ondaje ni wi nip i wi wisiniân.
18. Ninga pasikwi, n'os endâte ningat ija, ningat ina: n'ose, ningi pataindint, ningi nickiha Kije Manito, gaie kin, ki ki nickihin.
19. Kwatisiân keiabate ke ki oiosiminan, anotaganing gote totawicin.
20. Mi dac keget i pasikwigobanen i nansikawâte 'osan. Megwate wasa i pi tâte, mi i wabami-gote 'osan; tee o kockonaweekawan kije inini o kwisisan epite gitimagenimâte, mi gote i mādjiapatote ij awi nansikawâte, o kwaekwanotawan ij oiodjimâte.
21. Win dac ockinawe et inan 'osan: n'ose, ningi pataindint, ningi nickiha Kije Manito, gaie kin, ki ki nickihin; kwatisiân, mi wan onom 'osan ket igoîân.
22. Taiagwate kije inini o ganonà ot anotaganà, ot inà: kinipik, pitawik o sasekawagwinan, pitekonaiehik, minik titibinindjibizon, pitakisinehik gaie.
23. Pinik waninote atikons, nisik, ki ga wikondinanan.
24. Mi waam ningwisik, nipoban, aiapiteipangin nind inenima; wanicinoban, nongom dac mikaganiwi. Mi dac keget i mādji wikongewate.
25. Kawin apisigoban sesikisite wekwisisiminte, kitikaning inendigoban; apite dac pa kiwete, endawâte pa otitang, mi i nondawâte metwe nikamonidji gaie metwe-nimihitinidji.
26. O pipakiman anotaganan pejik, o kakwedjiman: anin enakamigak wendji modjikakami-kisiegi?
27. Ot igon dac anotaganan: ki cimenj ki tagocin, k'os dac o ki nisan atikonsan waninonidjin, epite modjikisite ij otisigote o kwisisan i mino pimatisinîte.
28. Ka kikenindang ij ondji modjikisinaniwaninik, nickatisi, kawin wi piudikesigoban. Mi dac i sakahaminite 'osan, ot ani pagosenimigon ockinawe kitei pindikete.
29. Ot inan dac 'osan: n'ose, caie aindaso pipon eko anokitonan, ka maci kanake pejik minago manadjenicenjie ki ki mijisi kitei wikomagwa nitewenhiak saiakihagik.
30. Win dac ki kwisis nongom wetisik, kakina ka wanadjitote minikik ka tipanehatiban matei ikwewa i ki papamenimâte, atikons waninote ki ki nisa win ondji.
31. Ot igon 'osan: ningwise, kakik ki papaganawenindimin, kakina inikik tebenindamân, kin ki tibenindan.
32. Inenindagwat dac kitei wikongeng gaie kitei modjikising ki cimenj ondji; nepongin inenindagosiban, nongom dac aiapiteipangin apitenindagosi; wanicinoban, nongom dac mekaganiwingin inenindagosi.





IV.—*Some Indoor and Outdoor Games of the Wabanaki Indians.*

By MRS. W. W. BROWN, Calais, Maine.

(Presented by John Reade, May 23, 1888.)

The proverbial gravity of the North American Indian does not prevent his indulging in pastimes or sportive recreations; and the less warlike the disposition of the tribe, the more diversified the games, which seem to be the necessary outlet of otherwise repressed energy. Especially is this true of the Wāban-ā-chiel; and though, for the most part, these games were for the purpose of gambling—a vice certainly carried to excess among the Indians,—yet the number of simple games for mere amusement were many, and engaged in by old and young very energetically.

Many of these aboriginal games are remembered only in name, or nearly forgotten even by the oldest Indian. A few—perhaps, the most important—are still played; but they are being fast superseded by games introduced by civilization.

## I.

I will first speak of those specially adapted for indoors, viz., All-tes-teg-enūk, Wy-pen-og-enūk, T'wis and Ko-ko-nag'n.

(1.) *All-tes-teg-enūk*.—This is not peculiar to the Wabanaki tribes. A very similar game, known under various names as Dish, Platter, Plumstones, Dice, etc., is mentioned by several writers. It seems to have been for a long time the great gambling game, played by old and young, male and female, both in public and private. Whole tribes assembled and watched the progress of the game with great enthusiasm, not only for hours, but for days in succession, and as the game neared the close, the excitement became intense. Spectators as well as contestants are said to have been agitated to a state bordering on frenzy. To this day it is played with great animation, with incantations for good luck and exorcising of evil spirits, by waving of hands and crying *Yon-tel-eg-wa-wūch*. At a run of ill luck there are peculiar passes made over the dish, and a muttering of *Mic-mac-squs ūk n'me hū-ook* ("I know there's a Micmac squaw around.") At times a stranger would think a dispute between the contestants imminent, and expect bloodshed, but there is not the slightest inclination to quarrel, and the honesty of the players is never questioned. The complications possible in this game are numerous, but seem to adjust themselves in the counting. All-tes-teg-enūk is played by two persons kneeling,—a folded blanket between them serving as a cushion on which to strike the shallow wooden dish, named *wal-tah-hū-mo'g'n*. This dish contains six thin bone discs, about three-fourths of an inch in diameter, carved and colored on one side and plain on the other. These are

tossed or turned over by holding the dish firmly in the hands and striking down hard on the cushion. For counting in this game, there are forty-eight small sticks, about five inches in length, named *ha-gǔ-ta-mā-g'n'al*; four somewhat larger, named *t'k'm-way-wāl*, and one notched, called *non-ā-da-ma-wuch*.



Fig. 1.—Manner of holding the *Wal-tah-ha-mo'g'n* (dish) in playing *All-tes-teg-enūk*.

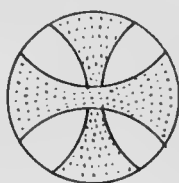


Fig. 2.—One of the *All-tes-teg-enūk* (a flat, carved disc.)

All the sticks are placed in a pile. The discs are put in the dish without order; each contestant can play while he wins, but on his missing, the other takes the dish. Turning all the discs but one, the player takes three small sticks, twice in succession, nine sticks, three times in succession—one big stick or twelve small ones. Turning all alike once, he takes a big stick, twice in succession—three big ones, or two and lays a small one out to show what is done, three times in succession he stands a big stick up—equal to sixteen small ones from opponent—the notched one to be the last taken of the small ones—it being equal to three.

When all the small sticks are drawn and there are large ones left in the pile—instead of taking three from opponent, the players lay one out to show that the other owes three sticks, and so on until the large ones are won. Then, unless the game is a draw, the second and more interesting stage begins and the sticks have different value. Turning all the discs but one, the player lays one out—equal to four and from opponent. Turning all the discs but one, twice in succession, he lays three out—equal to twelve from the other—three times in succession—stands one up, equal to one large or sixteen small ones. Turning all alike, he sets up one large one, twice in succession; then three large ones, or lacking these, three small ones for each large one. This would end the game if the opponent had none standing, as there would be no sticks to pay the points. But a run of three times of one kind in succession is unusual. When one has not enough sticks to pay points won by the other, comes the real test of skill, although

the former has still several superior chances to win the game. If he has five sticks, he has three chances, if seven or nine sticks he has five chances; that is, he places the discs in position, all one side up, for each of the tosses: the other contestant takes his turn at playing, but cannot place the discs. Then, giving the dish a peculiar slide, which they call *la luk*, or "running down hill like water," and at the same time striking it down on the cushion, he may, unless the luck is sadly against him, win twice out of three times trying.

One of their legends tells of a game played by Youth against Old Age. The old man had much *m'ta-ou-lin* (magic power). He had regained his youth several times by inhaling the breath of youthful opponents. He had again grown old and sought another victim. When he found one whom he thought suited to his purpose he invited him to a game of All-tes-teg-enük. The young man was also *m'ta-ou-lin*, and for a *pō-he-gan* had *K'che-bal-lock* (spirit of the air) and consequently knew the old man's intention, yet he consented to a game. The old man's *wāl-tah-hä-mo'g'n* was a skull and the *äll-tes-teg-enük* were the eyes of former victims. The game was a long and exciting one; but at each toss off by the young man, the discs were carried a little higher by his *po-he-gan* until they disappeared altogether. This broke up a game that has never been completed. The legend says that the old man still waits and the young man still outwits him.

(2.) *Wy-pen-og-enük*.—This game, like All-tes-teg-enük, has long been a gambling game. The discs are very similar, but larger, and eight in number. The players stand opposite each other with a blanket spread on the ground between them. The discs are held in the palm of the hand and "chucked" on the blanket. This game is counted with sticks—the contestants determining the number of points necessary to win before commencing to play.

(3.) *Ko-ko-nug'n* has a resemblance to the game of Checkers, but, though nearly all are more or less proficient at the latter game, there are only a few that understand *Ko-ko-na-g'n*. This, unlike any other game, may be played by male and female opponents. It is the least noisy, the skilful play requiring deliberation and undivided attention. A smooth surface is marked off into different-sized spaces, and pieces of wood, round and square, marked to qualify value, are generally used, though sometimes carved bone is substituted.

(4.) *T'wis*.—This which is also an indoor game, is at present oftenest played for amusement. The *t'wis* is composed of an oblong piece of moose-hide, about four inches in length, punctured with small holes, the centre one being slightly larger than the others. This piece of hide is joined to a bundle of cedar (*arbor vitæ*) boughs, tightly wound round with cord. To this, by about six inches of string, is attached a sharp-pointed stick, tied near the centre and held between the thumb and finger like a pen-handle. The game consists in giving the moose-hide a peculiar upward toss, and at the same time piercing one of the holes with the point of the stick. The number of points necessary for winning is usually set at one hundred. Each player can hold the *t'wis* until he misses a point.

Another kind of *t'wis* was made of several pieces of bone strung loosely together, each having a certain value, and being counted by catching on the point of the stick, similarly to the holes in the moose-hide.

There is a tradition that the first *t'wis-ūk* were made from that peculiar fungus which grows out from the bark of trees and is known to the Indian as *wā-be-la-wen* or

*squaw-oc-l'moos-wūl-dee* that is, "the swamp woman's dishes" (*Squaw-oc-moos* is the *bête noire* of the Indian legends and even now, children will not play with toad-stools, through the fear of the swamp woman). "One night," so the story runs, "during a very important game of *T'wis*, on which everything available had been wagered, both contestants fell asleep. The one having the *t'wis* was carried by Med-o-lin many miles into a swamp. When he awoke, he saw *Squaw-oc-moos* eating out of the dishes and a *t'wis* made of boughs in his hands."

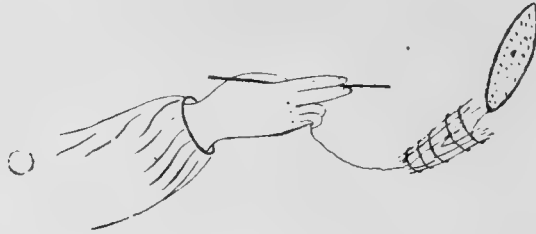


Fig. 3.—*T'wis*.

It seems quite impossible to get a *t'wis* constructed from these *wal-dee*. The Indians will describe such a *t'wis* and promise faithfully to make one, even resenting any insinuations that they are afraid to do so. Their promise, nevertheless, for whatever reason, remains unfulfilled.

## II.

The outdoor games requiring, as they do, strength, endurance, swiftness and skill are not calculated to confirm the charge of indolence so often brought against the Indians. Of these:—

(1.) *T'so-há-ta-ben* or *T'so-hē-ūc* requires more skill, both in construction and playing, than other outdoor games. It is played on the crust or hard-drifted snow of the hill side. If this is the game spoken of by other writers, as "Snow-snakes," there is nothing in the name to so indicate. Each player is supposed to supply himself with the required few *t'so hē-ac* (sticks). In that case, all the sticks are "bunched" and thrown up, except five sticks, though it sometimes happens that quite a number will join in the game, each contestant catching what he can as they fall. These sticks have different values, and as distance is what is aimed at, the one going furthest wins all the others of the same kind. They are set in motion by that peculiar movement which boys use in "skipping" stones on the water.

The shouts of the players, as the stick flies over the snow to the goal of success, or buries itself in the drift of defeat, are deafening. As the sticks are, one by one, set in motion, the player sings *la-há-wá*, *la-há-wá* calling the stick by name, and this, echoed and reechoed from the valley, is not altogether unmusical. The sticks, or *t'so-he-ūc*, are named *m-quon*, *ā't'ho-sis*, *p-tqûk whol-éik*, *ske-ga-weis* and *be-dupk-ts*. *M'quon* (the spoon) is about two feet long, flat at top and bottom, with one end concave like the bowl of a spoon. *A-t'ho-sis* (the snake) is long, slender and round, one end resembling a snake's head, the other pointed. *Ske-ga-weis* is flat underneath, round on top, about two feet in length, one end notched to resemble its name of wart. *P't'gûk-whol-ûk* is the largest of all. From five

to seven feet long and nearly round, both ends raised slightly and pointed, going with great force and speed, it dives in and out through the snow, causing much merriment and noisy betting. *Be-dupk't's* (the duck) is about three feet, flat on top, round underneath, with an end like the head of a duck. Sometimes these *t'so-he-ac* are clever imitations the coloring bring also effective. Though this game is not played as much as formerly, even the young boys seem to understand whittling the sticks into a recognizable resemblance to the duck.

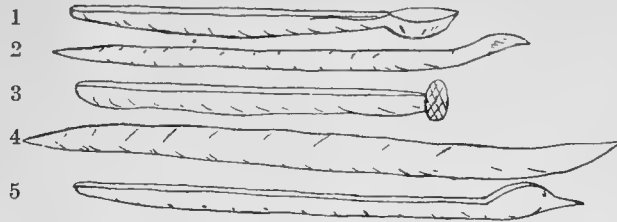


Fig. 4.—T'SO-HE-AC—(1) M'quon (the Spoon); (2) At-ho-sis (the Snake); (3) Ske-gā-weis (the Wart); (4) P'v'gukwhol-ūk; (5) Be-dupk-t's (the Duck).

(2.) *N'ā-ta-sol-té-ben*.—This is better adapted to children's play, yet the older squaws enjoy it equally well. After counting out one to act as *squaw-oc-t'moos*, they form into line by each taking the one in front by the dress between the shoulders. Sometimes ten or twelve will be in this line. The first one plays mother, protecting the numerous family behind her from *squaw-oc-t'moos*. The latter keeps crying *Bo-wod-man wū-ses-uk* ("I want babies") and runs first one way then the other, trying to catch hold of one in his line. To prevent this, the mother tries to keep her always in front, causing those furthest from her to move very swiftly—like a spoke in the wheel, the end near the rim making a larger circle than at the end of the hub, in the same time. As the excitement increases, they lose equilibrium and go tumbling over the ground, scrambling to get out of the way of *squaw-oc-t'moos*, as the one caught has to take her place. A person who has never seen this game can little imagine the amount of noise of which female lungs are capable. The counting out is not very different from that of white children. They all place two fingers of each hand in a circle; the one who repeats the doggerel, having one hand free, touches each finger in the circle, saying *Hōny, kee-bee, lā-weis, āg'-les, hun-tip*. Each finger that the *hun-tip* falls on is doubled under and this is repeated again and again until there are but three fingers left. The owners of these start to run and the one caught has to play as *squaw-oc-t'moos*. To the Indian mind, "counting out" has a significance, and even the simple *hun-tip* is a magic word bringing good luck, as it lessens the chance of being *squaw-oc-t'moos*.

(3.) *E-bes-qua-mo'gan*, or Game of Ball, seems to have been the most popular and universal of the outdoor games, and played by all North American tribes. Their legends are more or less indebted to it. Tradition gives it a prominent place in their wonderful mythology. The Aurora Borealis is supposed to be Wā-ba-banal playing ball. Among the Wabanaki it was played by women as well as men but, with few exceptions, never at the same time and place, as hunters and warriors played ball to gain muscular power, to stimulate their prowess and to augment their fleetness of foot.

The players formed in a circle, proportionate to the number, engaged in the game.

Each held a stick called *e-bes-quā-mo'gan-a-tok*. This was made of some flexible wood, about three feet in length, crooked to three-fourths of a circle at one end, which was interwoven with stripes of hide after the manner of snowshoes. One man was detached to stand in the centre and on his throwing into the air a chip, upon which he had spat, each one would cry "I'll take the dry" or "I'll take the wet," thus forming opposite factions. The side of the chip which fell uppermost decided which party should commence play. The ball was never touched with the hand, but thrown and kept in motion by the *e-bes-quā-mo'gan-a-tok*. The goals were two rings or holes dug in the ground, the distance of the circle of players apart. The game consisted in getting the ball into opponent's goal, and regard for neither life nor limb was allowed to stand in the way of possible success. As they played with little or nothing on, few escaped unhurt, but these mishaps were taken as the fortunes of war, and no resentment was felt. The women dress very scantily while playing this game, and the men, having a strict code of honor, never go near their playground. One tradition tells of a man that did so and threw shells and pebbles at the players. They screened themselves as best they could behind bushes and rocks. At the second attack, however, they made a rush in the direction from which the missiles came. The man ran to the water and plunging in was turned into a *che-pen-ob-quis* (large chubfish) by which transformation they knew he was a Mohawk. They look upon all Mohawks as addicted to sorcery.

V.—*The Indians of British Columbia.*

By FRANZ BOAS, PH. D.

(Presented by Dr. T. Sterry Hunt, May 30, 1888.)

For a long time the remarkable culture of the Indians of Northwest America has attracted the attention of ethnologists ; but, so far, no progress has been made in solving the difficult problem of the origin of this culture. Attention has been called to the favorable circumstances under which these people live, the abundance of food, and the mildness of climate which favor a steady progress of civilization ; but anthropogeographical considerations cannot be considered a sufficient basis for these studies, as their influence is only secondary in determining, to a certain extent, the direction in which the culture develops. A study of the origin of any culture must begin with that of the people, with the study of its ethnological and physical character.

The fact which impresses itself most strongly upon our minds is the great diversity of peoples inhabiting the north-west coast of our continent. Their general distribution is admirably shown on the Ethnological Map of British Columbia by Drs. Tolmie and Dawson. We notice the following divisions on the latter : the Tlingit, Haida, Tsimshian, Bilqula, Kwakiutl,<sup>1</sup> Nutka, Cowitchin, Niskwalli, Salish, Sahaptin, and Tinné. Among these the Bilqula, Cowitchin, Niskwalli, and Salish belong to one linguistic stock—the Salish. The Nutka are probably an independent stock, while the Tlingit and Haida are related to one another.

Among these stocks the Salish are by far the most important, occupying as they do an enormous territory. The observer of the tribes of this race will be struck by the diversity of dialects of their language. These dialects, according to their affinities, may be grouped as follows. First, there are the dialects of the interior, of which the Salish proper may serve as a specimen. In British Columbia two dialects of this group are spoken : the Okanagan and the Ntlakyapamuq or Sn̄shwapmuq. The second group is that of the Coast Salish, which is spoken on the coasts of Puget Sound and the Strait of Georgia. I studied the division of the latter into dialects in the winter of 1886-87, and found that, in British Columbia alone, not less than six or seven dialects exist, each spoken by a few tribes. The southern of these dialects have almost throughout the same radicals ; but the meaning of each word undergoes material changes in the various dialects. Besides this, words occurring in one language in a very simple form, are in the others reduplicated or even triplicated ; transpositions of consonants, elimination of vowels, and transformations of consonants making it sometimes hardly recognizable.

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<sup>1</sup> [The same word is written by Dr. G. M. Dawson *Kwakiool*, Trans. Roy. Soc. Can., V. ii. 6, and by Rev. Alfred Hall *Kwagiutl*, Trans. Roy. Soc. Can. VI. ii. 6.—ED. NOTE.]

Here is an example: *lām* is "house" in the dialect of the Sk'qō'mic; the same word is found as *tlem* in the dialect of the Çatlō'ltq and Pentlatc. The former call "house" also *āya*, a word of doubtful origin. The Snanaimuq use the reduplicated form *lū'lem*; the Lk'uŋgen change *m* into *n*,—as is the case throughout in their dialect—and have the word *ā'len*. A comparison of a few such words is given in the following list which is the first complete enumeration of the Canadian dialects of the Coast Salish:—<sup>1</sup>

ENGLISH.	LK'UNGEN.	SNANAIMUQ.	SK'QŌ'MIC.	SĪ'CIATL.	PE'NTLATC.	ÇATLŌ'LTQ.
<i>Angry</i>		tā'tēyak	t'ā'yek	tā'tayak	t'ā'yak	(qā'qadjam)
<i>Basket, strap for carrying</i>	siŋgā'teŋ	tse'meten	tei'm'atem	(k'ātla)	(k'ātla)	(k'ātla'a)
<i>Blanket</i>		ē'ts'em		ē'ts'em	ēts'amē'n	ē'ts'am
<i>Boat</i>	sne'quilt	sne'quilt	sne'quilt	ne'quilt	ne'quilt	ne'quilt
<i>Bone</i>	sts'ām	ctcām	cā'ō		ciā'ō	qan'cin
<i>Breast</i>	tsūgatl	s'ē'les	s'ē'lēnes	alē'nas	sek'enā's	aiē'nas
" <i>female</i>	sk'ma	sk'ma	stelk-oē'm	k'emō'o	sk'emā'o	(tsu'mten)
<i>Brother, elder</i>	cāitl	setlā'ētcen		setlā'aten, (nō'utl)	(tlē'wēt)	(nō'utl)
" <i>younger</i>	(sā'itcen)	sk'ā'ek	sk'āk	k'ē'eq	k'ē'eq	k'ē'eq
<i>Call, to</i>		k'ā'it	k'ā'it	k'elā'tan	k'ā'latem	k'ē'latem
<i>Cedar</i>	qpā'i	qpā'i	qā'paiai	sqpā'ē	t'ā/camai	qepā'ē
<i>Chief</i>	siā'm	siā'm	siā'm	(hē'wus)	(hē'wus)	(hē'gyus)
<i>Copper plate</i>		sk'oē'les	sk'oē'les		sk'oē'ls	k'ō'koēs
<i>Crow</i>	sk'koāta	k'elā'k'a	k'elā'k'a	k'elā'k'a	kyēkyā'kya	kyēkyā'ka
<i>Cry, to</i>	qoā'am	qām	qām	qā'qawum	qā'wan	(tlō'quit)
<i>Drink, to</i>	k'oā'k'oa	k'ā'k'a	(tāk't)	k'ō'k'oa	k'ō'ok'oa	k'ō'ok'ō
<i>Eat, to</i>	ē'tlen	ā'tlten	ē'tlten	ē'tlten	ē'tlten	ē'tlten
<i>Eyebrow</i>	sā'ūgen	cā'man	tsō'man	qō'mētē	qō'man	qō'man
<i>Full</i>	selā'tsetl	seli'ts	siē'tc	letci'et	litc	yite
<i>Good</i>	āi	āi	hā'atl	ai	aiētō	āi
<i>Grandson</i>	ē'eūgas	ē'maḡ	ē'mats	ē'maḡ	ē'maḡ	ē'maḡ
<i>Herring</i>	stlā'ūget	slā'wat	slā'wut	(sk'ūpts)	(sk'ō'lk'am)	tlā'agat
<i>House</i>	ā'leū	lā'lem	lām	tlem, e'luwem	tlems	tlems, (ā'ya)
<i>Hungry</i>	k'ōā'k'oē	k'ōā'k'oē	quiō's	k'ōā'k'oaē	k'ōā'k'oaē	k'ā'k'ats
<i>Island</i>	tltcās	skgā	s'ā'ek's	skuē'ktsaaḡ	ckgā'as	ku'çais
<i>Jay</i>		equi'ts'es	kcā'os		kya'ckyac	kua'ckuac
<i>Kelp</i>	k'ōā'aū	k'ām	k'ōm	skō'mēt	k'sā'am	kō'mēt
<i>Large</i>	teek	sī	hē'iē	tē'iē	tī	tī
<i>Mountain</i>	sūgā'nit	smānt	smā'nēt	smānt	smā'nit	(tā'k'at)
<i>Mouth</i>	sā'sen	cāḡen	tsō'tsen	qō'sin	qō'ḡin	qō'ḡin
<i>Otter</i>		sk'ātl		k'ā'k'atl	k'ā'k'atl	k'atl
<i>Relations</i>	tcā'dja	yā'yits	siā'i	yā'ya		djā'dja
<i>Rib</i>	lu'kwaq	lau'aq	lō'uaq	lō'uq	lō'aq	(yiqṭ)
<i>Scar</i>		sk'ē'itl	sk'ak'ē'itl	sk'ē'iyētl	k'ā'yētl	k'ā'djētl
<i>Snake, a fabulous</i>	sē'ntlk'ē	s'ē'etlk'ē	sē'noatlk'oi	(a'lhōs)	(ai'hōs)	(ai'hōs)
<i>Snow</i>	ūgā'k'ē	mā'k'ā	mā'k'a	(sk'ō'maē)	(aq)	(k'ō'māi)
<i>Tongue</i>	tē'qsetl	tē'qcatl	mēk'a'lqsatl	tē'qcuatl	tē'qcuatl	tē'qcuatl
<i>Water</i>	k'ōā'a	k'a	(stāk')	(s'ē'wuḡ)	(s'ē'wuḡ)	k'ā'ea
<i>Wave</i>	(sk'tlē'lak'cn	hā'yēlak	yō'yaek	iō'lak	iō'lak	djō'uak

A study of the vocabulary of the Çatlōltq shows that they borrowed a great number of words from their northern neighbors, the Kwakiutl. It shows also the peculiarity of

<sup>1</sup> Words derived from separate roots are placed in parentheses.



an extensive use of auxiliary verbs in the inflexion of the verb. The enormous number of dialects of the Coast Salish is particularly remarkable when compared with the uniformity of the language of the Nutka, and with that of the Kwakiutl.

The last group of the Salish are the Bilqula, who are widely separated from the rest. Accordingly their language differs much, comparatively, from that of the Salish proper and Coast Salish. It seems that a considerable number of foreign words, particularly such of Kwakiutl origin, have been embodied in the language, while its grammar bears all the characteristic features of the Salish grammar. The elimination of vowels has reached a very great extent in this case, numerous words consisting exclusively of consonants. The comparison upon page 50 shows that there can be no doubt as to the Salish origin of the Bilqula. The fact that a number of expressions bearing upon the sea are the same in both groups, leads me to the conclusion that they separated from the other tribes after having lived for some time on the coast.

The following list shows that the Wik'ē'nok', a tribe of Kwakiutl lineage, inhabiting Rivers Inlet, borrowed many words from the Bilqula, and *vice versa*. The borrowed words are marked with an asterisk:—

ENGLISH.	BILQULA.	WIK'Ē'NOK'.
<i>Bear, black</i>	nān*	nān
“ <i>grizzly</i>	tl'a	tl'a*
<i>Beaver</i>	kōlō'n	kōlō'n*
<i>Blanket, to take off</i>	k'ōē'qom*	k'ō'qtlsut
<i>Bracelet</i>	yū'yuq*	gy'ō'kula
<i>Chief</i>	.....	hē'mes*
<i>Dog</i>	wa'tsē*	wa'tsē
<i>Elk</i>	tlā'les*	tlōls
<i>Finger, first</i>	ts'ēm	ts'ē'mala*
<i>Hook</i>	k'atlai'yū	k'atlai'yū*
<i>Kettle</i>	qanisā'tls	hā'nihtlanō*
<i>Lake</i>	tsātl	tsā'latl*
<i>Rattle</i>	ye'ten	ye'ten*
<i>Sea Lion</i>	tl'ē'qēn*	tlē'qēn
<i>Shaman</i>	atlk'oa'la*	tlōk'oa'la
<i>Starfish</i>	k'ātsq*	k'ātsk
<i>Thumb</i>	k'ō'na*	k'ō'ma
<i>Tobacco</i>	tl'ā'uk*	tlā'ok*

## ENGLISH-BILQULA VOCABULARY WITH REFERENCE TO OTHER SALISH DIALECTS.

ENGLISH.	BILQULA.	LK'U'NGEN.	SNANAIMUQ.	SK'QÖ'MIC.	Sİ'CIATL.	PE'NTLATC.	ÇATLÖ'LTQ.
<i>Apron</i>	tsī'op	.....	çē'ip	.....	sī'ap	.....	.....
<i>Bad</i>	sq	sqā'a	.....	.....	.....	.....	.....
<i>Beard</i>	sk'ō'bots	.....	.....	.....	k'ōpō'ogin	.....	k'ō'pōçen
<i>Beaver</i>	kōlō'n	sk'elā'o	sk'elā'o	sk'elā'ō	k'ō'lut	.....	.....
<i>Belly</i>	nuk/htla	.....	k'oa'la	k'ul	.....	k'ulā'	koā'oa
<i>Berry</i>	sk'ai'lot	sk'olā'm	.....	.....	.....	k'olā'ma	.....
<i>Blanket</i>	itsa'mi	.....	ē'ts'em	.....	.....	ē'ts'amēn	.....
<i>Boil, to</i>	slōmē'm	.....	lemtlā'lem (to cook)	.....	.....	.....	.....
<i>Bone</i>	tsāp	stsām	etçām	cā'ō	.....	ciā'ō	.....
<i>Boy</i>	tsāaste'tq	.....	.....	.....	.....	stā'uquatl	.....
<i>Breast</i>	sk'ma	sk'ma (fe- male breast)	sk'ma (same)	.....	sk'ma (same)	sk'ma (same)	.....
<i>Breast-bone</i>	skava'los	.....	.....	sk'ōā'wōnas	.....	.....	.....
<i>Brother (younger)</i>	ā'qē	.....	sk'ā'ek'	sk'āk'	k'ē'eq	.....	.....
<i>Child</i>	mē'na	.....	.....	men	mē'man	mē'na	mā'ana
<i>Damp</i>	lhk'	.....	tlōk'	.....	.....	tlēk'	.....
<i>Dead</i>	atē'ma	.....	.....	.....	.....	te'men	.....
<i>Eat, to</i>	atltp	.....	ā'tlten	.....	.....	.....	.....
<i>Eye</i>	tlk'lōks	.....	.....	k'elō'm	.....	.....	.....
<i>Face</i>	mō'sa	.....	.....	.....	meō's	.....	moō's
<i>Father</i>	mān	.....	.....	.....	.....	.....	mān
<i>Fire-drill</i>	yulē'mta	ce'letcup	ce'ltsep	.....	.....	.....	.....
<i>Fly, to</i>	sī'h sek'	.....	.....	sē'sek'	.....	.....	.....
<i>Full</i>	atlikh	.....	.....	.....	.....	lite	.....
<i>Good</i>	ia	ai	ai	.....	.....	.....	.....
<i>Grandfather</i>	k'ō'k'pi	.....	.....	.....	.....	.....	kōpā'a <sup>1</sup>
<i>Gull</i>	k'litk'	.....	k'ulē'tak'	.....	.....	.....	.....
<i>Hair</i>	mē'lhkoa	.....	.....	.....	.....	.....	mā'k'ēn
<i>Hook</i>	k'atlai'yū	.....	.....	k'atlā'yu	k'atlā'yu	k'atlā'yu	k'atla'yu
<i>House</i>	sōtl	door suā'tl	door ciā'tl	road cuā'tl	door ciā'otl	.....	.....
<i>Killer (Delphinus Orca)</i>	siū't	.....	.....	yō'yous	.....	.....	.....
<i>Lake</i>	tsātl	.....	.....	.....	tslātl	selā'tl	sā'eatl
<i>Martin</i>	qē'qē	qā'ak'en	.....	.....	.....	.....	.....
<i>Moon</i>	tl'ōkh	tlk'alte	.....	.....	.....	.....	.....
<i>Mother</i>	etān	tān	.....	.....	.....	.....	.....
<i>Mountain</i>	smt	.....	smā'nēt	.....	smānt	.....	.....
<i>Mouth</i>	tsū'tsa	sā'sen	çā'çen	tsō'tsen	.....	.....	.....
<i>Night</i>	entl	nāt	snēt	.....	.....	.....	nāt
<i>Nose</i>	mā'qsē	.....	mē'k'sen	.....	.....	.....	.....
<i>Paddle, to</i>	acā'sitl	.....	ē'çel	.....	.....	.....	hē'utcis
<i>Quick</i>	tl'i	.....	.....	.....	.....	tlē'e	tlē'e
<i>Seal</i>	asq	asq	asq	.....	asq	asq	asq
<i>Sing, to</i>	siū't	.....	.....	siū'n.	.....	.....	.....
<i>Sit, to</i>	āmt	ā'mat	.....	.....	.....	.....	.....
<i>Slave</i>	snā'aq	.....	.....	.....	.....	snātq	nā'anik'
<i>Sleep, to</i>	tsitō'ma	ē'tut	.....	.....	.....	.....	tlā'tsit
<i>Stone</i>	tqt	.....	.....	.....	.....	.....	tā'k'at mountain
<i>Sweep, to</i>	k'ō'ts'in	.....	ē'qoset	.....	.....	.....	.....
<i>Thick</i>	ptlt	.....	ptlāt	ptl'ōtl	petlt	petlt	.....
<i>Tongue</i>	tih'tsa	ti'qsetl	tē'qçatl	.....	.....	.....	tē'qçuatl
<i>Uncle</i>	sī'si	.....	.....	sē'sē	.....	.....	.....
<i>Water</i>	kqla	k'ōā'a	k'a	.....	.....	.....	k'ā'ea

<sup>1</sup> SHUSHWAP:—kō'kpi, chief.

Remarkable among the words in the table upon page 49 is that for "chief," *h'w'mes* of the Wik'ē'nok', which we find as *h'w'wus* in the Pe'ntlac dialect, while the Bilqula have the word *stalto'mh*, which is of doubtful origin.

I believe I have shown by these examples that philological researches will prove a very powerful means of solving the questions regarding the history of the Northwest American tribes. Particular attention ought to be paid to the extensive borrowing of words, which I have shown to exist among the southern tribes, and which may also be observed among the Tlingit, Haida, and Tsimshian.

In the study of the evolution of the culture of these tribes, the question, what originally belongs to each tribe, and what has been borrowed from foreign sources, must constantly be born in mind. Philological researches will largely help us in solving the problem. But one of the fundamental questions to be answered before any definite results can be obtained is : What tribes and peoples have been influenced or have exerted an influence upon Northwest American culture ? The answer to this question will define the area of our studies. The coast tribes must first be compared with their neighbors, the Eskimo, Tinné, Sahaptin, Chinook, Kutonaqa.

As regards the Eskimo of Alaska, the following points are worth mentioning. We observe an extensive use of masks, the peculiar wooden hat of the southern tribes, the use of the *labret*, the festivals in which property is given away, the houses built on the same plan as Indian houses, the sweat-bath, the existence of slavery, and the high development of the art of carving. The existence of so many similar or identical phenomena in two neighboring peoples cannot be fortuitous. Besides this, the folklore of the tribes of British Columbia refers to the Eskimo country and to the Eskimo as plainly as possible. Here is an abstract from a legend which it would be unreasonable to doubt refers to the Eskimo. I heard the tradition at Rivers Inlet from a Wik'ē'nok'.

There was a man whose name was Apotl. One day he was invited to a feast, and after dinner he requested a boy to take a dish with food to his wife. The boy obeyed. And when Apotl's sons saw the large dish full of meat and berries, they rose from their beds where they were sleeping, and wanted to participate in the meal. Their mother, however, said, "This is not for you, Apotl sent the food for me. If you want to have any thing, go to K'ēhtsumskyana and find something there." K'ēhtsumskyana, however, was a cannibal who lived in a country far, far away. Then the boys were sorry, they lay down sullenly, and remained in bed for four days without taking food or drink. On the fourth day the inhabitants of the village saw a swan swimming near the houses. The children tried to catch it, but they were unable to get hold of it. When Apotl's sons heard this, they arose, took their bows and arrows, and launched their boat. They approached the bird and shot an arrow at it. The arrow hit the bird, but did not kill it. It swam away, and the boys pursued it. Whenever they came near it, they shot it, but although they hit it again and again, they were unable to kill it. Thus they continued to pursue it farther and farther, and eventually caught it. Then they intended to return home, but, lo ! there were no village and no mountain, nothing but water and sky. The boys did not know where to go. After they had drifted to and fro, for a number of days, an icy wind began to blow, and now they knew that they had killed the master of the wind. The sea began to freeze, and with the greatest difficulty they succeeded in pushing their boat through heavy masses of ice. When they had drifted for many days without know-

ing where to go, the paddle of the youngest of the boys broke. He was tired, fell asleep, and at last perished of cold and hunger. After a short while, the paddle of the next broke and he also perished. Then the two surviving brothers wrapped their blankets around themselves, and after a while the third one died also. Now only the eldest remained. He fell asleep, but after a short while he felt that the canoe had struck the shore, etc.

Evidently the masses of ice referred to here, and the boat of sea-lion skin, which the boy later on receives as a present from the inhabitants of that land, refer to the Eskimo country. In several other legends, which I collected in the northern part of Vancouver Island, similar passages occur. In one of these, two brothers go adrift, and after a while reach a land where skin boats are used, and where the nights are very long.

Considering the great uniformity of Eskimo life all over Arctic America, I cannot but conclude that in Alaska, the Northwest Americans exercised immediate influence upon the Eskimo, and that west of the Mackenzie we do not find the latter in their primitive state of culture. It is not impossible, that, in consequence of this influence, inventions and customs which were originally Eskimo became more neglected than they were in other regions where foreign influences are not so strong.

But we have to consider several other points. The use of masks representing mythical beings, which is peculiar to Northwest American tribes, is not entirely wanting among the Eastern Eskimo. The giving away of property at certain festivals, and the use of the singing-house, with a central fire and places for the people all around the wall, may be traced as far as Davis Strait. It may even be that the plan of the snow or stone house of the Eskimo, with elevated platforms on three sides of a central floor, must be traced back to a square house similar to that of the western tribes.

I shall not enter into a discussion of the similarity between Eskimo and Indian folklore, as our knowledge of Alaska legends is too deficient. The few traces that are common to both are so widespread that they cannot be considered proof of an early connection between these peoples. The story of the dog who was the ancestor of certain tribes, the transformation of chips of wood into salmon, the idea that animals are men clothed in the skins of animals, stories of children who were deserted by their relatives and became rich and powerful by the help of spirits, and of a log that was the husband and provider of a number of women, are common to the folklore of Northwest America and to that of the Eskimo.

So far we have referred only to the influence of the Northwest Americans upon the Eskimo. Was there no influence in the opposite direction? We find this influence to exist, first, in the traditions which were mentioned above, further, in the use of certain implements. The peculiar Eskimo throwing-board is used by the Tlingit of Sitka, although fashioned according to their style of art. The Eskimo harpoon and the Northwest American harpoon must undoubtedly be referred to the same origin. The peculiar style of carving of the Northwest Americans has been developed by the Eskimo in such a manner, that whole figures are attached to masks and implements, the figures themselves being not conventional. Thus we may see a *kayak* on one wing of a mask, and seals that the hunter in the kayak pursues on another. This style has influenced the carvings of the Tlingit, and particularly those of the Yakutat.

If we try to compare the ethnological phenomena of the other neighbors of the Northwest Americans with the customs and habits of the latter, we must unfortunately confess

that we know hardly any thing about these tribes. Dr. G. M. Dawson noticed on his recent journeys, that the raven myths of the Tlingit are also known to the Tinné; but this is only one isolated fact. Thus we find that we are unable to pursue our study systematically, for lack of information. It is of the greatest importance that the latter should be collected as soon as possible, as the remains of ancient customs and usages as well as the tribes themselves are fast vanishing. In the territory of the Dominion of Canada the study of the Tsimshian of the interior, of the Tinné near Babine Lake, of the Kootenay, and of the Salish of the interior, is of prime importance for solving the problems under discussion.

Having thus in vain attempted to define the scope of the necessary preliminary studies, we will consider the culture of the coast tribes somewhat more closely.

The general impression is, that it is uniform; but the traveller finds many customs peculiar to one tribe, and not practiced by another. These slight variations are one of the best clues for historical investigations. Among the Kwakiutl, for instance, we find a very elaborate system of secret societies, of which only faint traces exist among the Coast Salish and among the Tlingit. Therefore we must suppose that the general culture can be traced back to various sources. We will try to follow up some of these indications.

First, we will consider the raven legend. The raven plays a very remarkable part in the myths of the Tlingit. He is the benefactor of man—against his will and intent. He is considered the deity, and yet in the course of events, he is always tricked and fooled. He is sometimes called “the old one,” thereby recalling “the old one” of the Algonkin. As much has been written regarding these legends, I hasten to consider their distribution along the coast.

The Kwakiutl have a great number of legends referring to the raven. One of these, an abstract of which I shall give presently, is particularly interesting. It refers to his origin. This legend originated among the Tsimshian and was later borrowed by the Kwakiutl. It is said that a chief's wife had a child who used to play with another boy of the village. One day the chief's son said to his playfellow, “Let us take the skins of birds and fly to heaven.” They did so, and arrived at Aikyatsaiensna'laq. There they found a small pond, near which the house of the deity stood. They were caught by the daughters of the latter, whom they eventually married. The deity, who is called Kants-ō'ump (“our father”), tried to kill his sons-in-law. They, however, escaped unhurt. They lived in heaven for a long while, and eventually the deity's daughter gave birth to a child. The latter slipped out of her hands, and fell into the sea, where it was found by a chief, the father of the young man who had ascended to heaven. At first the child would not take any food; but when, according to the advice of an old man, the stomachs of fish were given to him, he began to eat greedily. He devoured all the provisions that were stored up in the village, and then said, “Don't you know me? I am Omeatl” (the raven). Then the legend continues, and describes innumerable adventures that the raven encounters in his wanderings all over the world.

Evidently this legend is an attempt to reconcile the ideas of the Tsimshian and other southern tribes, who worship the sun, with those of the Tlingit, who consider the raven the deity: therefore he is made the son of the deity in heaven. Among the adventures of the raven we find also the story of how the raven stole the sun. It is important to state that the chief who kept the sun from man in a box had the sun, the moon, and the day-

light in his possession, and that it is considered the exploit of the raven to have obtained the daylight.

Far less important is the raven in the mythology of the Bilqula. They have also the tradition referring to the origin of the sun ; and, the raven is said to have made the salmon. But, besides this, only trifling adventures, in which he appears as extremely greedy, are recorded.

Similar traditions are told by the Çatloltq. They say that the raven accompanied the son of the deity in his migrations all over the world ; but, besides this, he has no connection whatever with their religious ideas, and he is not considered the creator of the sun or of the water. From these facts it appears that the raven myths have their origin among the northern tribes.

The next series of traditions we have to consider are those referring to the sun ; and among these a certain class, in which the mink is considered the son of the sun, is particularly remarkable. These legends are recorded only among the Bilqula and Kwakiutl. The resemblance of this legend to that of the Greek Phaëton is quite remarkable. The Wik'ē'nok tell it in the following form :—Once upon a time mink played grace-hoops, with the ducks and mink won. They next shot with arrows at a stick, and mink proved to be the best marksman. Then all the ducks abused him and maltreated him, and finally broke his bow ; and the ducks said, " We do not care to play any longer with you. You do not even know where your father is." Mink became very sorry. He cried and ran to his mother, whom he asked where his father was. She said, " Now, stop your crying. Your father is in the sky. His name is Toatusela'kilis and he carries the sun every day." Then mink resolved to visit him. He went to his uncle, Hanatlinaqto'o, and asked him to make a new bow. When he had got the latter, he took his arrows and shot one to the sky. The arrow stuck in the sky. The second arrow hit the notch of the first. And so he continued until a chain was formed reaching from the sky to the earth. Then mink climbed up and arrived in the sky. There he met his father's second wife. When she recognized mink, she said, " Your father will be glad to see you. You may carry the sun in his stead." When it grew dark the father returned home. His wife said, " Your son has come. He will stay with you. Now, let him carry the sun in your stead." Toatusela'kilis was very glad, and early in the morning he roused his son. He gave him his blanket and his nose-ornament, and bade him ascend slowly behind the mountains. He warned him not to go too fast, else the earth would begin to burn. Mink took his father's clothing and slowly ascended. When it was almost noon, he got impatient. He began to run and to kick the clouds which obstructed his way, and thus he set fire to the earth. Man, in order to escape the flames, jumped into the ocean ; and part of them were transformed into animals, part into real man (before they had been half animal, half man). Toatusela'kilis's wife in heaven, however, called her husband, and bade him throw mink from heaven to the earth. He seized mink, tore off his blanket and his nose-ornament, and flung him into the sea, crying, " If you had gone slowly, as I ordered you, you might have stayed here." Mink fell into the sea between some drifting logs. There, a man found him, and carried him home.

Similar traditions are found among the Coast Salish tribes. They all refer to the sun, but the mink does not ascend to heaven, some other animals or two brothers taking his place.

Among the Coast Salish and the northern tribes of Kwakiutl lineage, a great number of fables and tales refer to the mink, but these are similar in character to those told by the Tlingit and their neighbors referring to the raven. It is only among the Snanaimuq that the mink is of some importance, as he obtained the fire. The legend says the ghosts were in the sole possession of the fire. Mink wanted to have it, and for this purpose stole the infant child of the chief of the ghosts. The ghosts pursued him, but did not dare to attack him, and offered in exchange for the child, furs, mountain-goat blankets, and deer-skins, and finally the fire-drill. Mink accepted the latter, and thus obtained the fire. From all we know about the traditions of the Northwest American Indians, it seems that the series of legends treating of mink as the son of the sun are confined to the Bilqula and Kwakiutl, and that they have spread to some extent among their northern and southern neighbors. As the mink occupies a position of similar importance to that of the raven, many of the adventures and exploits of the latter are also told of the former. We have shown above that the Bilqula are closely related to the Coast Salish. As the latter have no legends referring to the mink as the son of the sun, we conclude that the Bilqula adopted them from the Kwakiutl. Thus we have found a second centre from which the folklore of Northwest America has spread.

We have frequent occasion to mention the important part played by the sun in the legends of these Indians. The farther south we proceed, the more important becomes the sun as a mythological figure. Among the Coast Salish we observe that he is worshipped, although no offerings are made to him, while it is said that the Salish of the interior burn food, blankets, and other property as an offering to the sun. The most important of the legends referring to the sun, which are known only in the southern parts of the coast, are those referring to his murder, and the origin of the new sun and of the moon. Linguistic research has shown that, among a great number of tribes of this region, sun and moon have the same name; and a study of the legends shows that they are really considered one and the same person, or at least as two brothers. These facts are so important that I shall give one of the traditions belonging to this group. I heard it told by a Čatloltq at Comox.

A long time ago the gum was a man named Momhanā'te, who was blind. As he was unable to endure the heat of the sun, he went, during the night, fishing. When the day began to dawn, his wife came down to the beach and called him, saying, "Hasten to come home. The sun is going to rise." Thus he returned before it grew warm. One day, however, his wife slept too long, and when she awoke she saw that it was daylight. She ran to the beach and called her husband to come home as quick as possible. He hastened as fast as he could, but it was too late. The sun was so hot that he melted before he reached the shore. Then his sons spoke unto one another: "What shall we do? We will avenge father." And they made a chain of arrows reaching from heaven to earth, and climbed up. They killed the sun with their arrows. And they thought, "What shall we do next?" The older one said, "Let us be the sun." And he asked his brother where he wanted to go. The latter answered, "I will go to the night: you go to the day." And they did so. The younger brother became the moon, the elder the sun.

Connected with the sun myths we find the legend of the wanderer. He is considered the son of the deity, and called by the Coast Salish *Qals*, and by the Kwakiutl *K'anikila*. He instituted the laws and customs which are rigidly observed, and he transformed man

into animals, and killed malignant beings which infested the country. I mentioned above that the ancient beings, who were neither men nor animals but similar to both, were transformed into real men and animals at the time of the great flood. This myth is found from southern Alaska to the northern parts of Vancouver Island, while farther south the transformation by the wanderer takes its place. I am not quite sure whether the wanderer legend is known to the northern tribes of the Kwakiutl. It seems, however, to be less important than it is farther south. The Kwakiutl proper consider the wanderer as identical with the raven, but I believe that this idea also originated in consequence of a mixture of northern and southern mythology, and that these two all-important mythological persons, who originally belonged to two distinct mythologies, are combined in one person here.

Unfortunately I do not know whether the legends of the great transformer are known to the Bilqula; but, even if they exist, they cannot be of great importance as I did not hear him mentioned once, when collecting a considerable number of myths.

This comparison of the myths of the various tribes shows that they spread from three centres. This conclusion is corroborated by a comparison of customs. We may consider the Tlingit the representatives of the northern centre. The raven is the chief being of their mythology. We find here the origin of the remarkable copper plates which are used as far south as Fraser River. These tribes are divided into clans or *gentes*, the child belonging to the mother's *gens*. The dead are not buried but burned. A comparison of the carvings shows that those of the Tlingit are far less conventional than those of the southern tribes. The most southern people belonging to this group is the Tsimshian.

The mythology of the tribes belonging to the central group is characterized by a mixture of the raven myths, the sun myths, and those of the wanderer and the mink. Here the child belongs to the father's *gens*. One of the most remarkable customs of these tribes is the cannibalism which is connected with their winter dances. Only members of certain *gentes* can become cannibals, but each of these must be properly initiated. The Kwakiutl believe a certain spirit to live in the mountains, and that by encountering it the member of a certain family will become cannibal. The latter has certain prerogatives during the season of the winter dances, and during two months is entitled to bite whoever displeases him. These customs are also practised by the Bilqula; but they have evidently been adopted from the Kwakiutl, as the allied tribes farther south do not practice them. The same ceremonies are in use among the Tsimshian, who borrowed them from the Kwakiutl.

The characteristics of the southern group are sun-worship, the less extensive use of carvings, and the small degree of art displayed in their manufacture. While the houses of the northern tribes are square, and beautifully carved and finished, the tribes of the southern group live in wooden houses which are about five or six times longer than they are wide.

Common to all these groups are a considerable degree of skill, a comparatively high state of art, the general mode of life, the great winter festivals, and the donation feasts, the so-called *pottatches*.

We conclude our brief review, which is presented more to call attention to the important problems which the ethnology of the Northwest Coast offers than as a contribution



to their actual solution. Our investigations are everywhere hampered by a lack of accurate knowledge, sometimes even by that of any knowledge.

The only conclusions at which we have arrived are these: that the ethnography of the inland tribes and of those inhabiting the northern and southern parts of the coast must be studied before we can solve the question as to the origin of Northwest American culture, and that the latter has had its origin in three different regions and among three different peoples.

NOTE.—In explanation of some of the above phonetic equivalents:—

<i>e</i> (ital.)	=	<b>e</b> in "answer."
<i>k</i> *	=	a deep guttural.
<i>q</i>	=	German <b>ch</b> in "Bach."
<i>h</i> (ital.)	=	German <b>ch</b> in "ich."
<i>tl</i>	=	exploded <b>l</b> .
<i>ç</i>	=	<b>th</b> in "thin."



VI.—*A Grammar of the Kwāgiutl Language.*

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(Presented by Dr. G. M. Dawson, May 30, 1888.)

## INTRODUCTORY.

This grammar was not originally compiled for publication, but to assist those missionaries and teachers who should succeed me, to acquire a knowledge of the Kwāgiutl language. When I first came amongst these Indians in 1878, I experienced great difficulty in obtaining a knowledge of the idiom of this language, and much that was then learned had subsequently to be unlearned. I had perhaps finished ninety pages of manuscript when Dr. G. M. Dawson, of the Geological Survey, visited our neighbourhood. Finding that he took a great interest in Indian, I spoke of the work upon which I was then engaged. He strongly advised me to complete the grammar, and suggested the Transactions of the Royal Society of Canada as a medium of publication.

There are doubtless many inaccuracies which are open to correction, but I trust there is something in my work which will afford pleasure to the philologist, and I earnestly hope it may prove an assistance to those who wish to gain a knowledge of Kwāgiutl, in order that they may ameliorate the condition of these Indians.

## THE KWAGIUTL PEOPLE.

The Kwāgiutl Language is spoken by the Indians who live on the north of Vancouver Island and the adjoining coast of British Columbia. They were once a powerful nation, and the terror of the Haida and Tsimshians who had to pass their villages on their way south. In 1853 they are said to have numbered 7,000, but the census taken in 1884 showed that there were less than 3,000 souls. The most southern village is that of the Likwītldākw at Cape Mudge; the most northern that of the Gwāsila in Smith's Inlet. The distance between these two is about 150 miles. There is great similarity in the language spoken by the natives of River's Inlet, Bella Bella, and as far north as Gardiner's Inlet, but I do not include these with the Kwāgiutl nation, as they do not form part of Kwāgiutl Indian Agency. There are fourteen Kwāgiutl villages, all of which are on the coast. Commencing from the south and proceeding north they are as follows:—

## A.—LIKWITLDAKW.

1. Wiwekī.....Cape Mudge.
2. Wiwekum and Kwīkū.....Loughborough Inlet.
3. Kākūmāzis.....Salmon River.

B.—KWAGIUTL.

- 4. Mādītłbi.....*Havannah Channel.*
- 5. Danākdāk̄w.....*Knight's Inlet.*
- 6. Tlāwītsīs.....*Turner Island.*
- 7. Māmālılīkula.....*Village Island.*
- 8. Numk̄is.....*Alert Bay.*
- 9. Zāwāda-inūkw.....*Kingcombe Inlet.*
- 10. Kwagiutl.....*Fort Rupert.*
- 11. Kūskīmūhw and Gwāzinūkw.....*Kwatsino Sound.*
- 12. Nāgwākdāk̄w.....*Blunden Harbour.*
- 13. Klāklasikwila.....*Hope Island.*
- 14. Gwāsila... ..*Smith's Inlet.*

I.

PHONOLOGY.

There are twenty letters in the Kwāgiutl alphabet, five vowels and fifteen consonants. The vowels are *a, e, i, o, u*. The consonants are *b, d, g, h, k, l, m, n, p, s, t, w, x, y, z*. The consonants *c, f, j, q, r* and *v*, are not required. The Indians find great difficulty in pronouncing *f, r* and *v*. When attempting to say *flowers* they invariably pronounce it “*pflowers*”; in a similar manner, *river* is pronounced “*liver*”; *fly*, “*ply*,” and *very*, “*belly*.”

I.—VOWEL SOUNDS.

The vowels most in use are *a, i* and *u*, while *e* and *o* are seldom required

VOWELS.	KEYWORDS.	EXAMPLES.
<i>a</i> <i>ā</i>	<i>bat</i> <i>father</i>	} <i>bagwānum (man)</i>
<i>e</i>	<i>they</i>	
<i>i</i> <i>ī</i>	<i>tin</i> <i>machine</i>	} <i>klīsila (sun)</i>
<i>o</i>	<i>home</i>	
<i>u</i> <i>ū</i>	<i>but</i> <i>rule</i>	} <i>kun ūmp (my father)</i>
<i>au</i> <i>aw</i>	} <i>audit</i>	
<i>ia</i>		<i>alleluia</i>
<i>iu</i>	<i>view</i>	
<i>ii</i>	<i>yi (one syllable)</i>	

II.—CONSONANT SOUNDS.

There are six consonants that are often difficult to distinguish as pronounced by the Indians, viz. : *b* and *p* ; *d* and *t* ; *g* and *k*. Even when they write letters in their own

language they themselves confound these letters. However, after the ear has grown accustomed to their sound they are distinguishable. I once spelt *bagwānum*, man, with a *p*; *dunum*, rope, with a *t*; and *ginānum*, child, with a *k*. As a rule, the consonants pronounced by Europeans *p*, *t*, *k*, are pronounced by the Indians *b*, *d*, *g*.

*T* and *D*.—I have chosen *t* as a final consonant and *d* as an initial, e.g. *glūkwiṭ glūk-wīdagia*; *īṭit* makes *īṭidagia*.

*G* always has the sound of *g* in the English word *gig*, and is generally followed by a diphthong, e.g. *giakun*; *giukw*.

*H* is an aspirate as in *hyūsīt* (rest); *nāhwā* (all). In many words like *lāhdūkṵ* and *muhīt*, the *h* unites the syllable before it to the one following it, and sounds not unlike *h* in *hue*.

*K* is of very frequent occurrence in Kwāgiutl. If occurring in Roman character in an Italic word, or in Italic in a Roman word, it is equivalent to *ch* in “Loch.” If in heavy type (**k**) it has the sharp clicking sound of the raven.

*Z* is equal to *ds*.

## II.

### PARTS OF SPEECH.

There are eight parts of speech in the Kwagiutl language:—

- (1) NOUN, as *hwākwuna*, canoe; *glos*, tree; *gilā*, cinnamon bear.
- (2) ADJECTIVE, as *zūtla*, black; *wālas*, great; *num*, one.
- (3) PRONOUN, as *yīn*, I; *nūs*, mine; *lūk*, him.
- (4) VERB, as *dūkwiṭlīn*, I see; *dūkwiṭlīn*, I am seen; *kīṭlilas*, you are afraid.
- (5) PREPOSITION, as *ulkgīlī*, behind; *lūk*, to; *nāhwātla*, near to.
- (6) ADVERB, as *aulī*, truly; *ulūk*, nearly.
- (7) CONJUNCTION, as *glū*, and; *lā-tā*, but; *kāt*, or; *kā-īks*, because.
- (8) INTERJECTION, as **k***lawū*, how beautiful; *anānā*, an exclamation when hurt; *ā-kias-awū*, splendid.

### I.—NOUN.

A Noun is the name of any person, place or thing, as *Nugezī*; (a person's name, meaning a great mountain) *Zīmas*, Victoria; *sītlum*, snake; *egialazī*, goodness.

#### (1.) NUMBER OF NOUNS.

There are two numbers, the singular and plural. The singular denotes one object, the plural more than one. The plural is formed either by reduplicating the first syllable of the singular, or by a modified form of it. Thus—

ENGLISH.	SINGULAR.	PLURAL.
<i>man</i>	bagwānum	hī-bagwānum
<i>box</i>	gildas	gil-gildas
<i>brush</i>	zābāyū	zīzābāyū
<i>basket</i>	lakāyī	la-ulkāyī
<i>table</i>	humbdumītl	hī-humbdumītl
<i>canoe</i>	hwākwuna	hwā-hwakwuna or hwī-hwākwuna
<i>tree</i>	glos	glāk-glos
<i>carpenter</i>	gitīnūk	gīgitīnūk
<i>fool</i>	nunūlū	nīsnunūlū
<i>woman</i>	zidāk	zīdāk
<i>dog</i>	wātsī	wa-ūtsī

The plural of *kīranūk*, son or daughter, is *sāsum*.  
There is no plural form used for

*gīg*, tooth ; *kwūsī*, potato ; *glabum*, nail ; *kākāū*, hen ; *mukwila*, moon ; *kīūtīla*, salmon.

The adjective *kīnum*, many, is generally employed with such nouns, or the number specified, e.g. *kīnum kwūsī*, plenty of potatoes ; *mātl-tsum mukwila*, two months.

(2.) GENDER OF NOUNS.

Gender is the distinction of nouns with regard to sex, and is recognised in the Kwa-giutl language. There are two modes of distinguishing gender.

(a) *By Different Words.*

MASCULINE.	FEMININE.
ump, father	abump, mother
kwillī, uncle	anīs, aunt
kākump, grandfather	kākās, grandmother
awāzawī, stepfather	abāzawī, stepmother
bābāgwum, boy	zāzādākum, girl
wīsa, infant son	kuna, infant daughter
tlāwunum, husband	kunum, wife
glūlī, nephew	glūlī-kās, niece
gikumī, chief	gikumī or ūma, female chief

(b) *By Prefixing.*

The word *bagwānum* prefixed to nouns is masculine, and *zīdūk* to nouns feminine, as *bagwānum kwūs*, male deer ; *zīdūk kīwūs*, female deer.

- NOTES.—(1) The noun is generally understood and therefore seldom mentioned.  
 (2) Certain words are used either for masculine or feminine :—

kwanūk<sup>w</sup>, son or daughter.  
 nagwūmp, father-in-law or mother-in-law.  
 nūla, elder brother or sister.  
 zāya, younger brother or sister.  
 wākwā, a woman's brother or a man's sister.

## (3.) CASE OF NOUNS.

Case shows the relation of a noun to other parts of the sentence. There are but two cases, viz., (1) a case that stands for Nominative, the subject, and Objective, the object of the sentence; (2) the Possessive Case, denoting the relation of property or possession. This is formed by the preposition *of*, e.g. "This is Henry's house" is literally in Kwagiutl, "this is the house of Henry," *gia um giukw's Henry*. The apostrophe shows that a letter has been elided: written fully it would be *giukw as Henry*.

## EXAMPLES.

wīnī giukwas Henry,	Where is the house of Henry?
gia um hwākwuna sin ūmp,	This is the canoe of my father.
kilhwā klin klāk kwākwune's aus,	I will buy the canoe of your father.
kīlats sīwāyau sin ūmp,	Bring me the paddle of my father.
zihkī kwauūkwasa māmātl-ā,	The son of the white man is sick.

## (4.) FORMATION OF NOUNS.

Most of the Kwagiutl nouns are formed from verbs, e.g. *īākula* is the verb "to work," and from this verb we get the following nouns :—

- (1) *īākulāyū*, a tool (*wizin īākulāyau?* where is my tool?)
- (2) *īākulā-īnūk*, a labourer or one skilled in labour. (*īākulā-īnūk-wī<sup>1</sup> aus.* Your father is a labourer.)
- (3) *īākulilgis*, a servant. (*wīdīs īākulilgisa?*<sup>1</sup> Where is your servant?)
- (4) *īākulūt*, fellow workman. (*lā klin āle-kl kun īākulūt.* I will go and look for my co-worker.)
- (5) *īākulānum*, wages or what is gained by work. (*kīyosin īākulānum.* I have earned nothing.)
- (6) *īākulas*, place of work. (*wī dīs īākulasa?* Where are you working?)
- (7) *īākulazī*, workshop. (*hās uk-īt kun munyāyau lākā īākulazī.* Fetch my ruler from the workshop.)

The following is a list of nouns formed from their several verbs :—

## 1.—AYU OR TOOL NOUNS.

NOUNS.		VERBS.	
ligiayū,	hammer.	likun,	<i>I strike.</i> <sup>2</sup>
munyāyū,	measure.	munsin,	<i>I measure.</i> <sup>2</sup>
kunāyū,	needle.	kunun,	<i>I sew.</i>
sūbāyū,	axe.	sūpun,	<i>I chop.</i>
hyildāyū,	saw.	hyiltin,	<i>I saw.</i>
kigiayū,	oar.	kikiyin,	<i>I row.</i>

<sup>1</sup> The final letters *ī* and *ā* need some explanation. The former (*ī*) is part of the verb "to be." The letter (*ī*) is the sign of the interrogative.

<sup>2</sup> The first Person Singular is *un* when it follows *k*, *k*, *m*, *n*, *p*, *w*, and *in* when it follows *d*, *g*, *l*, *s*, *t*, *v*.

2.—*INUK* OR SKILL NOUNS.

NOUNS.		VERBS.	
likīnūk,	<i>blacksmith.</i>	likiun,	<i>I hammer.</i>
munyīnūk,	<i>surveyor.</i>	munsin,	<i>I measure.</i>
kunīnuk,	<i>seamstress.</i>	kunun,	<i>I sew.</i>
sūpīnūk,	<i>axeman.</i>	sūpun,	<i>I chop.</i>
hyiltīnūk,	<i>sawyer.</i>	hyiltin,	<i>I saw.</i>
munīnūk,	<i>drummer.</i>	muhyin,	<i>I strike.</i>

NOTE.—The affix *inūk* means “skilful,” and added to the root of the verb forms a noun meaning “one skilful” in the action expressed by the verb, e.g. *munīnūk*. The Indians strike their drums with that part of the fist near the little finger, and a Canadian drummer would not be a *munīnūk*.

3.—*ILGIS* OR AGENT NOUNS.

kutlililgis,	<i>nurse.</i>	kutlilin,	<i>I nurse.</i>
hātīākūlilgis,	<i>collector of money.</i>	hatlākun,	<i>I pay.</i>
hāmīksīlilgis,	<i>cook.</i>	hāmīksilin,	<i>I cook.</i>
tsiyilgis,	<i>one who draws water.</i>	tsiyyin,	<i>I draw water.</i>
sūpīlgis,	<i>wood chopper.</i>	sūpun,	<i>I chop.</i>
hyiltīlgis,	<i>sawyer.</i>	hyiltin,	<i>I saw.</i>

4.—*UT* OR FELLOW-AGENT NOUNS.

umtlwūt,	<i>playfellow.</i>	umtlin,	<i>I play.</i>
kāswūt,	<i>walking companion.</i>	kāsin,	<i>I walk.</i>
kākūklūt,	<i>fellow scholar.</i>	kākūklin,	<i>I learn.</i>
humūt,	<i>dining companion.</i>	humāpun,	<i>I eat.</i>
hānāklūt,	<i>hunting companion.</i>	hānāklin,	<i>I hunt.</i>
lastūt,	<i>fellow bather.</i>	lastin,	<i>I bathe.</i>

5.—*NUM* OR ACT NOUNS.

humyānum,	<i>berries picked.</i>	humsin,	<i>I pick berries.</i>
kīglānum,	<i>fishes netted.</i>	kīklin,	<i>I fish with a net.</i>
unīkānum,	<i>firewood obtained.</i>	unīkun,	<i>I am getting firewood.</i>
dīdānum,	<i>thing borrowed.</i>	dīdīn,	<i>I borrow.</i>
kīlwānum,	<i>thing bought.</i>	kīlwun,	<i>I buy.</i>
kwenum,	<i>produce of labour.</i>	kwīgīlasin,	<i>I work.</i>

6.—*AS* OR PLACE NOUNS.

sūpas,	<i>chopping place.</i>
hyiltas,	<i>sawing place.</i>
laās,	<i>place he has gone to.</i>
mīkās,	<i>sleeping place.</i>
kāyas,	<i>place of walking, a path.</i>
ukās,	<i>place where he stops.</i>

7.—*AZI* OR HOUSE NOUNS.

hawāk-ulazī,	<i>prayer house, church.</i>
umlazī,	<i>playroom.</i>
nāniyāzī,	<i>goat house.</i>
hāmīksīlazī,	<i>kitchen.</i>
kiadugwāzī,	<i>library.</i>
tsiya-wāzī,	<i>pincushion.</i>

8.—*ILAS* OR BUILDING NOUNS.

gudānilas,	<i>stable, from gūdān, a horse.</i>
kīlwīlas,	<i>store, “ kīlwā, to buy.</i>
gia-īlas,	<i>sleeping apartment.</i>
kwa-īlas,	<i>sitting room.</i>

9.—*MUT* NOUNS (WORTHLESS THINGS.)

sūyāpmūt,	<i>chips.</i>
hyilhyatmūt,	<i>sawdust.</i>
hāamūt,	<i>crumbs.</i>
zīākāmūt,	<i>shells of cockles, &amp;c.</i>



## 10.—GIATL AND ALA, SOUND NOUNS.

kwe,	} giatl or yala.	{	noise of crying.
hun <b>k</b> li,			report of a gun.
lākwi,			shout.
hī <b>k</b> i,			noise.
dumī,			sound of a bell.
kabali			noise made by the Indians when loading or unloading their canoes.

Thus we have *kwe-giatl* or *kwayāla*, *hun**k**li-giatl* or *hun-**l**ālā*. The former is employed when the sound is heard once, the latter when it is continuous. The word for "Indian language" is literally the sound that the Indian makes. *Kwā-kwāla* means the Kwagiutl language, *Māmātl-ā-**l**ālā*, the white man's language and *Tsin-**l**ālā* the Chinese language.

## 11.—DUM AND UND, TIME NOUNS.

iākulah-dum,	working time.	iākulā-unk,	working season.
hawākulāh-dum,	time of prayer.	uml-unk,	playing season.
hāmāp-dum,	dinner hour.	<b>k</b> wilunk,	feasting season.
zawunk,	winter.	hūnk,	summer.

## II.—ADJECTIVE.

Adjectives are words added to nouns, in order to distinguish them more accurately or to limit the extent of their significance. They may be divided into three kinds:—

- (1) ADJECTIVES OF QUALITY, as *wālas*, large.
- (2) ADJECTIVES OF QUANTITY, as *nukokw*, ten (men).
- (3) DISTINGUISHING ADJECTIVES, as *kā*, the ; *giāda*, this.

The Kwagiutl adjective is modified by number, but does not vary in respect to gender or case.

## INSTANCES.

	SINGULAR.	PLURAL.
<i>Bad</i> ,	yāksun,	yāksun.
<i>Black (man)</i> ,	zūtla,	zūzatlum.
<i>Short (man)</i> ,	zukwuksdī,	zutlzakwuksdī.
<i>Great</i> ,	wālas,	awo.
<i>Small</i> ,	umāyī,	um-umāyī.
<i>A good man</i> ,	ek bagwānum.	
<i>Good men</i> ,	esuk bī bagwānum.	
<i>A good boy</i> ,	ek bābāgwum.	
<i>A good girl</i> ,	ek zāzādākum.	

NOTE.—*Ekī bagwānum* means "he is a good man," and *esukī bī-bagwānum*, "they are good men." Here the letter *ī*, which is part of the verb "to be," is joined to the adjective. Again, there are certain letters affixed to nouns, adjectives and verbs, in this language, by which you can understand the local position of the subject of the sentence.

*ī*, the person spoken of is not present.

*ig*, (this *g* is from the distinguishing adjective *giāda*, this) the person spoken of is present and nearer the speaker than the person spoken to.

*ā*k, the person spoken of is present, but nearer to the person spoken to than to the speaker.

k, if speaking of a place in which you are residing at the time, or the day on which you speak.

<i>ī</i>				<i>ig</i>	
ekī gīkumī,	<i>He is a good chief.</i>	} not present.	}	ekig gīkumī,	<i>He is a good chief</i>
yāksāmī ūmp,	<i>He is a bad father.</i>			yāksāmīg gīkumī,	<i>He is a bad chief, or</i>
naukādi bagwānum,	<i>He is a wise man.</i>			naukādig bagwānum,	<i>This is a bad chief.</i>
					<i>This is a wise man.</i>
					} near speaker.
<i>ūk</i>				<i>k</i>	
ekyūk gīkumī,	<i>He is a good chief.</i>	} near person spoken to.	}	Yalis }	<i>Alert Bay</i>
yaksāmūk gīkumī,	<i>He is a bad chief.</i>			Yalisik }	<i>Speaker not there.</i>
wudāla, cold; wudālūk,	<i>It is cold.</i>			ekyūk Yalisik,	<i>Speaker there.</i>
naukāduk bagwānum,	<i>He is a wise man.</i>			wudālūkwā nālāk,	<i>Alert Bay is a good place</i>
					<i>It is cold to-day.</i>
					} where speaker lives.

### (1) ADJECTIVES OF QUALITY.

There are three usual degrees of Comparison, the comparative ending in *kūwī* and the superlative in *kī*. Thus, *ek*, good; *ekiakūwī*, better; *ekiakī*, best. The last syllable of the superlative gives the idea "among," "best among all" or "best of all." This will be seen by comparison with the following words: *āwūkī*, inside of any substance; *gīgilkī*, walking among; *gīgīakī*, there among.

	POSITIVE.	COMPARATIVE.	SUPERLATIVE.
<i>Good,</i>	ek,	ekiakāwī,	ekiakī.
<i>Bad,</i>	yāksum,	yākiakāwī,	yākiakī.
<i>Tall (person),</i>	giltukst,	giltuksdākāwī,	giltuksdakī.
<i>Tall (tree),</i>	giltā,	giltākāwī,	giltakī.
<i>Black,</i>	zūtlā,	zūtlākāwī,	zuwilkī.
<i>Near,</i>	nahwātla,	nahwātākāwī,	nahwātākī.
<i>Old (person),</i>	kwilyukw,	kwilyākākāwī,	kwilyākakī.
<i>Old (man),</i>	nūmas,	nūmasākāwī,	nūmazakī.
<i>Long (time),</i>	kitla,	kitlakāwī,	kitlakī.
<i>Late,</i>	atl-īd,	atl-īdākāwī,	atl-īdakī.
<i>Much,</i>	kīnum,	kīkākāwī,	kīkī.
<i>White,</i>	mulā,	mulākāwī,	mulkī.
<i>Red,</i>	klākāwā,	klākākāwī,	klākakī.
<i>Blue,</i>	zāsā,	zāsākāwī,	zāzakī.
<i>Far off,</i>	kwīsāla,	kwīsālākāwī,	kwīsālākī.
<i>Great,</i>	wālas,	wālasākāwī,	wālazakī.
<i>First,</i>	gialī,	gialākāwī,	gialakī.

Every Adjective has a second Comparative to which the verb "to be" is attached.

#### EXAMPLES.

*Good, ek; better, āekiātla.*  
*Let it be done better (thing not near), āekiātla la hyī.*  
*Let it be done better (thing near), āekiātla la hyūk.*  
*Black, zūtlā; a trifle blacker, zāzūtlātla.*  
*He is blacker, zāzūtlātla (person not present).*  
*He is blacker, zāzūtlātālūk (thing spoken of present.)*  
*High, īkiāla; go a little higher, āīkiāstāla.*

Sometimes the sign of the Comparative *kawī*<sup>1</sup> is added, as *bābanātlakāwī la hyūk*, put it a trifle lower; *āekiātlakawī la hyūk*, do it a little better.

## VERBAL FORM OF COMPARISON.

	POSITIVE.	COMPARATIVE.
<i>Old man,</i>	<i>nūmas,</i>	<i>nānūmasātla.</i>
<i>Late,</i>	<i>ātl-it,</i>	<i>āatl-idātla.</i>
<i>Much,</i>	<i>kīnum,</i>	<b>kā</b> <i>kītla.</i>
<i>White,</i>	<i>mulā</i>	<i>māmūlātla.</i>
<i>Far,</i>	<i>kwīsāla,</i>	<i>kwākwisātla.</i>
<i>Red,</i>	<i>klākū,</i>	<i>klāklākātla, &amp;c.</i>

## SENTENCES ON THE ADJECTIVES.

<i>This is good,</i>	<i>gia um ek.</i>
<i>This is the better,</i>	<i>gia um ekiākāwī.</i>
<i>This is the best,</i>	<i>gia um ekiakī.</i>
<i>James is stronger than Charles,</i>	<i>tlokākāwāyī James sas Charles.</i>
<i>James is more playful than Charles,</i>	<i>umumtlbusakāwāyī James sas Charles,</i>
<i>I am tall but you are taller,</i>	<i>gilduksdin lā glā tas gilduksdākāwāya.</i>
<i>It is colder this winter than last,</i>	<i>wudālākāwāyūk da zawunk-āks zawunk-wūtlāk.</i>
<i>The sun is brighter than the moon,</i>	<i>yikā klisila kwukātla kāwī sa mukwila.</i>
<i>He is better to-day,</i>	<i>āekidātla kwā nāla.</i>
<i>This (canoe) arrived before the rest,</i>	<i>gialagīwī gia.</i>
<i>He is below (in position) his fellow men,</i>	<i>bunākāwī sīs bahwit.</i>
<i>He is beneath his companions,</i>	<i>bunākāwī sīs waūkw.</i>

## EXAMPLES OF THE SUPERLATIVE.

<i>He is the lowest of all,</i>	<i>bunālākī sa nāhwā.</i>
<i>This is the largest house of all.</i>	<i>gia um walazakī giukw.</i>
<i>This tree is the tallest tree I have seen,</i>	<i>gia um giltakī glosin dūkwitl.</i>

The Superlative is also expressed by adding the adverbs *kunklila*, very, *aul*, truly, and *hīnūma*, very, to the adjective. *Kunklila* is used in a bad sense, e.g., to say "very good" you must not employ *kunklila*, but *aul*, writing *aul ek*.

## EXAMPLES

<i>A very bad (man),</i>	<i>kunklila yāksūm</i>
<i>A very good man,</i>	<i>aul ek bagwānum.</i>
	<i>{ kunklila (sick understod).</i>
<i>He is very sick,</i>	<i>{ aulī zihkā (not present).</i>
	<i>{ aulig zihkā (near speaker).</i>
	<i>{ aulūk zihkā (near the person spoken to).</i>
<i>Very great,</i>	<i>hīnūma wālas.</i>
<i>He is very clever,</i>	<i>hīnūma egilwāt.</i>

## (2) NUMERAL ADJECTIVES.

## A.—Cardinal Numbers.

1. num.	4. mū.
2. mātl.	5. sikiā.
3. yūdūhw.	6. kuklā.

<sup>1</sup> *kāwāyī* and *kāwāya* are lengthened forms of *kāwī*.

7. aglabū.	18. mätlgwanätlagiyū.
8. mätlgwanätl.	19. nānumāgiyū.
9. nānumā.	20. mätltsumgiūstau.
10. lastū.	21. nanumkaula.
11. numagiū.	22. hamätlaula.
12. mätlagiyū.	23. hayūduhyaula, &c.
13. yūdūhwagiū.	30. yūdūhwsumgiūstau.
14. mūagiū.	100. läkind <i>or</i> numpunyāgi.
15. sikiāgiū.	200. mätlpunyāgi, &c.
16. kuklāgiū.	1,000. lūksūmhid ( <i>round or complete</i> ).
17. aglabūagiū.	1,000,000. tlinhī ( <i>a number which cannot be counted</i> ).

The number 31 is expressedly *yūdūhwsumgiūstau himisa nīm* (thirty and one), and so on to 35, which is *yūdūhwsumgiūstau himisa sikiā*. But for 36, because it is nearer 40 than 30, it is usual to say *māmūskumgiūstaula sa kukla*, and for 37 *māmūskumgiūstaula sa aglabū*. In the same manner 46 is *sīsikiāskumgiūstaula sa kuklā*.

Whenever the Indians count their fish, or trinkets, they say *num*, *mätl*, and so on up to 10. Then they begin again and go over the same ground till they get to *lastū*, 10, when they say *mätltsumgiūstau*, 20.

The terminations of their numerals vary according to the shape of the article referred to. Thus one (man) *numūkwa*; one dollar (because round), *numskun*; one pencil (because long), *numzūk*; one cup, *numūk kla*; one blanket (because square), *numksa*.

## (a) Persons.

1. numūkwa.	8. mätlgwanālūkwa.
2. mālūkwa.	9. nānumūkwa.
3. yūdūkwa.	10. nukokwa.
4. mūkwa.	11. numūgwagiū.
5. sikiokwa.	12. mālūgwagiū.
6. kuklokwa.	20. matltsumgiūstau.
7. aglabūkwa.	21. mätltsumgiūstau himisa numūkwa.

## EXAMPLES.

<i>There are six of us (person addressed not included),</i>	kuklokwanūhw.
<i>There are six of us (person addressed included),</i>	knklokwunts.
<i>How many men came?</i>	ginūkwā giak? <i>Two</i> , mālūkwa.
<i>I want two men (to work),</i>	ukīksdin klāk mālūkwa.

## (b) Dollars, or anything Round, such as Fruit or Barrels.

1. num-skum.	8. mätlgwanätl-tsum.
2. mätl-tsum.	9. nānumā-skum.
3. yūdūhw-sum.	10. nukā-skum.
4. mūskum.	11. num-skumagiū.
5. sikiā-skum.	12. mätl-tsumagiū.
6. kukla-skum.	20. matl-tsumgiūstau.
7. aglabū-skum.	21. nanumskumkaula.

## EXAMPLES.

<i>Give me six dollars,</i>	zaw la hyin kukla-skuma dāla.
<i>Where are my two dollars?</i>	widi lin mätl-tsuma dāla?
<i>I want one dollar a day,</i>	ukīksdin klāk numskuma dāla kā nāla.
<i>Nine barrels,</i>	nānumāskum ( <i>or</i> nānumskuma) kwākwoltl-tsum.
<i>Nine boxes,</i>	nānumskuma gildas.
<i>I have ten apples,</i>	nukā-skum gin apples.

## (c) Logs, Canoes, Pencils, &amp;c.

- |                |                      |
|----------------|----------------------|
| 1. num-zāk.    | 8. mätlgwanätl-zāk.  |
| 2. mätl-zāk.   | 9. nānumā-zāk.       |
| 3. yūdühw-zāk. | 10. nukā-zak.        |
| 4. mū-zāk.     | 11. num-zākagiyū.    |
| 5. sikiā-zāk.  | 12. mätl-zākagiyū.   |
| 6. kukla-zāk.  | 20. mätltsumgiūstan. |
| 7. aglabū-zāk. | 21. nanumzākaula.    |

## EXAMPLES.

*There are six (logs) on the beach,* kukla-zākūk lākwā klamāis.  
*How many pencils have you?* gin zākūs kiadāyau kūs? *Five,* sikia-zāk.  
*I have two canoes,* mätl-zākun hwākwuna.

The hour is expressed in this manner from the idea of the strokes on the face of the clock, e.g., "one o'clock" in Kwagiutl means that the clock has made or completed one mark; "two o'clock," it has made two marks.

*It is six o'clock,* lū kukla-zākila.  
*What o'clock is it?* lū gin zākila?  
*Five o'clock,* sikiā zākila.

## (d) Cups or any Vessels containing Liquids.

- |                  |                        |
|------------------|------------------------|
| 1. numīk kla.    | 7. aglabūwīk kla.      |
| 2. mätl uk kla.  | 8. mätlgwanätl uk kla. |
| 3. yūdühwuk kla. | 9. nānumīk kla.        |
| 4. mūwīk kla.    | 10. nukek kla.         |
| 5. sikiēk kla.   | 11. numīk kla giyū.    |
| 6. kuklek kla.   | 12. mätl-uk kla giyū.  |

## EXAMPLES.

*Six cups,* kuklek klā kwāsta.  
*How many cups have you?* gin nek klūs kwāstek? *Five,* sikiēk kla.  
*Take three spoonfuls daily,* yūdühwuk kla kis kā kiazanuk kā numk sa nāla.  
*I only had one glass,* numīk kla kis um.

**kis** refers to whatever enters the mouth.

## (e) Days, or anything Square such as Blankets or Tobacco-Plugs.

- |                 |                      |
|-----------------|----------------------|
| 1. numk-sa.     | 6. kukluk-sa.        |
| 2. mätluk-sa.   | 7. aglabūk-sa.       |
| 3. yūdühwuk-sa. | 8. mätlgwanätluk-sa. |
| 4. mūk-sa.      | 9. nānumāk-sa.       |
| 5. sikiāk-sa.   | 10. nukāk-sa.        |

## EXAMPLES.

*Another day has passed away,* la um lā ī heyākī da numk-sa nāla.  
*You give me three pairs (blankets),* } yūdühwuksin gietla ūkl.  
*(Literally, I put three pairs on you),*  
*There are four plugs of tobacco for a quarter,* mūksī da klokwī kā ī da numskum quarter.

It is more usual to say *num pun hwās* for one day; *mätl pun hwās*, two days, &c.; *pun*, time, e.g., I have been three times to see you, *lin yūdühw puna wāh dākwākl.* (*Wāh* implies failure.) How many days have you been here? *las gins pun hwās lākw?* Six days, *kukla pun hwās.*

B.—*Multiplicatives.*

Although these are adverbs and not adjectives I have, for convenience sake, placed them after the Cardinal Numbers which I have classed as Adjectives of Quantity.

<i>Once,</i>	num puna.
<i>Twice,</i>	mātl puna.
<i>Thrice,</i>	yūdūhw puna.
<i>Four times,</i>	mū puna.
<i>Five times,</i>	sikia puna.
<i>Ten times,</i>	nukā puna.
<i>One hundred times,</i>	lākind puna,
<i>One thousand times,</i>	lūksunh-īd puna,
<i>Many times,</i>	kī puna.
<i>Three times four,</i>	yūdūhw puna mū.
<i>Four times three,</i>	mū puna yūdūhw.

## EXAMPLES.

<i>I have been five times to Victoria, but my father</i>	lin sikia puna lā lāk Victoria, lā tin ūmpī la
<i>has been seven times,</i>	aglabū puna.
<i>Although I have many times forbidden you,</i>	wāh mun kī puna bulūkl.
<i>Three times four are twelve,</i>	yūdūhw puna mū mātlagīyū.

C.—*Distributive Numbers.*

## (a) Persons.

<i>One by one, or 1 each,</i>	nātl numūkw.
<i>Two by two, or 2 each,</i>	mā ī mālūkw.
<i>Three by three, or 3 each,</i>	yā ī yūdūkw.
<i>Four by four, or 4 each,</i>	mā ī mūkw.
<i>Five by five, or 5 each,</i>	sī sikiokw.

## (b) Dollars, &amp;c.

1 } <i>to each,</i>	nātl num-skum.
2 }	mā-ī mātl-tsum, &c.

## (c) Pencils, &amp;c.

6 }	kī-kuklā-zāk.
7 }	īglabū-zāk.
8 } <i>to each,</i>	mā-ī mātlgwanātl-zāk.
9 }	nī-nānumā-zāk.
10 }	na-unkā-zāk.

## (d) Blankets, &amp;c.

11 }	nātl numksa-gīyū.
12 }	mā-ī mātluksa-gīyū.
13 } <i>pairs to each.</i>	yātl-yūdūksa-gīyū.
14 }	mā-ī mūksa-gīyū.
15 }	sī-sikiaksa-gīyū.

## EXAMPLES.

<i>The disciples went out two by two,</i>	<i>mā ī mālukw maula da disciples.</i>
<i>Give them one (apple) each,</i>	<i>zaw lats nātl numskuma lāh dākwuk.</i>
<i>They each brought six logs,</i>	<i>kī-kukla-zāk gākyau sa bibagwānum.</i>
<i>They each have three bags of flour,</i>	<i>yātl yūdūhw sumī kwukāzes.</i>
<i>Each man had twelve pairs of blankets,</i>	<i>mā-ī mātluksa giyū gwum.</i>
<i>There were twenty men in each boat,</i>	<i>mā-ī mātl tsum giustau lākā nāhwā sakiis.</i>

## D.—Ordinal Numbers.

<i>First,</i>	<i>gialī.</i>
<i>Following (second).</i>	<i>mākila.</i>
<i>Last,</i>	<i>ātliksdī or ulk-gli.</i>

We cannot say "this is the second day of the month," but, "this is two days of the month;"  
*lū mātl pun hwasā mukwila.*

## E.—Miscellaneous Numbers.

## (a) Numbers expressing Bulk.

<i>Three rows of soldiers or three groups,</i>	<i>yūdūhwīdatla soldiers.</i>
<i>Three piles of books,</i>	<i>yūdūhwīdatla kiadukw.</i>
<i>Three heaps of potatoes,</i>	<i>yūdūhwīdatla kwūsi.</i>
<i>The ten commandments,</i>	<i>nukāhīdatla wātldum.</i>

The divisions of a sermon or lecture would be,

- I. numh-īdatla.
- II. mātl-īdatla.
- III. yūdūhwīdatla.

## (b) Numbers expressing Measurement.

<i>Thumb and forefinger extended, i.e. one measurement of the short hand,</i>	<i>numpunk lākā zuk-zānāyī.</i>
<i>Thumb and second finger extended, i.e. one measurement of the long hand,</i>	<i>numpunk lākā gil-zānāyī.</i>
<i>Two arms extended (fathom),</i>	<i>numpunk lākā bākla.</i>
<i>From centre of breast to end of extended arm,</i>	<i>nukabūdī waskumasas.</i>
1 } <i>Fathoms (or any measure you may be using).</i>	{ <i>numpunk.</i>
2 }	{ <i>matlpunk.</i>
3 }	{ <i>yūdūhwpunk, &amp;c.</i>
<i>1½ One fathom and a half,</i>	<i>numpunk hīmisa nukabūdī.</i>

## (c) Numeral Verbs.

<i>I am one, or alone.</i>	<i>numūkw mun.</i>
<i>You are alone.</i>	<i>" ums.</i>
<i>He is alone (person seen).</i>	<i>" um.</i>
<i>He is alone (the person not seen).</i>	<i>" mī.</i>
<i>Two of us (person addressed not included).</i>	<i>mālūkwunūkw.</i>
<i>Two of us (person addressed included).</i>	<i>mālūkwunts.</i>
<i>They are two, or there are two of them.</i>	<i>mālūkw dākw.</i>
<i>We are three, or there are three of us.</i>	<i>yūdūkwunūhw or yūdūkwunts.</i>
<i>We are four, or there are four of us.</i>	<i>mūkwunūhw or mūkwunts.</i>

## (3) DISTINGUISHING ADJECTIVES.

Kā, the; *giada* or *yik giada*, this; *kāda* or *yikā-da*, *hīt* or *yikūkda*, that. The Plural "these," "those," has the Singular form, except for persons, when "*dākw*," the sign of verb plural is added. To say "these chairs," use the plural form of the noun, e.g., *yik giada kwikwāhdumittlig*.

## EXAMPLES.

<i>The wind,</i>	<i>kā yaula.</i>
<i>The house,</i>	<i>kā giukw.</i>
<i>Go to the house,</i>	<i>hāgia lā kā giukw.</i>
1.—For near objects.	
<i>This is the best,</i>	<i>gia um ek giada.</i>
<i>In answer to "Which is the best?" This is,</i>	<i>gia mī giada.</i>
<i>This is my pen,</i>	<i>gia mun kiadāyūk.</i>
2.—For distant objects.	
<i>That is the best,</i>	<i>hīt ekī da.</i>
<i>Answer to "Which is the best?" That is,</i>	<i>hī dī da.</i>
<i>That is my book,</i>	<i>hī din kiadūk.</i>
<i>Do you mean this one?</i>	<i>yik giada?</i>
<i>No, kī; that one,</i>	<i>yikūk da.</i>
3.—Or if the object is still farther off <i>yikā da</i> .	
<i>This is a good child,</i>	<i>ekig ginānum (near the speaker who points to it—</i>
<i>This is a good child,</i>	<i>the final g is an abbreviation of giada.)</i>
	<i>ekyūk ginānum (near person addressed).</i>
PLURAL—	
<i>These (men),</i>	<i>yik dākw gwā da.</i>
<i>Those (men),</i>	<i>yik dākw kā da.</i>

## III.—PRONOUN.

A Pronoun is a word used instead of a noun to prevent the too frequent repetition of the same word. Pronouns may be classified under the following heads: Personal, Possessive, Relative, Interrogative and Indefinite Adjective.

## (1.) PERSONAL PRONOUNS.

## SINGULAR:—

1st Pers., <i>I, me,</i>	<i>nugwa um, in, um</i>
2nd Pers., <i>You,</i>	<i>ūkl, sū um, ūs.</i>
3rd Pers., Nom., <i>He, she, it,</i>	<i>ī, ūk, ig, ūs.</i>
Obj., <i>Him, her, it,</i>	<i>ik, āk, uk.</i>

## PLURAL:—

1st Pers., <i>we, us,</i>	<i>ints, unts, unūhw.</i>
2nd Pers., Nom., <i>you,</i>	<i>sūhdākw.</i>
Obj., <i>you,</i>	<i>dākwūkl.</i>
3rd Pers., Nom., <i>they,</i>	<i>lāhdākw.</i>
Obj., <i>them,</i>	<i>dākwuk.</i>



## EXAMPLES.

## (1.)

## 1ST PERS. SING. :—

<i>I strike,</i>	<i>likiun (with a hammer).</i>
<i>I saw,</i>	<i>hyiltin (with a saw).</i>
<i>I and the Father are one,</i>	<i>yin gla wī da ump numūkw munūhw.</i>
<i>In answer to "Who did it?" I did,</i>	<i>nūgwa um.</i>
<i>It is I, be not afraid,</i>	<i>nūgwa um, kwālā kitlil.</i>
<i>Ah! friend, it is you,</i>	<i>sau ī gla āde.</i>
<i>It is I,</i>	<i>nūgwa um.</i>

*Giākun* is the Objective Case, 1st Person Singular, "me"; the Plural is *giākunts* and *giākunūhw*. The first syllable of *giākun* is the verb "come," but, used as the Objective, it expresses motion towards; *un* is also the Nominative, but there it is never prefixed by *giāk*.

<i>Come to me,</i>	<i>kilas giākun.</i>
<i>Do you love me?</i>	<i>tlāhwila nūkw mas in a?</i>

N.B.—This final *a* is the sign of the Interrogative.

## (2.)

## 2ND PERS. SING. :—

<i>You my people,</i>	<i>yūkl giukwilūt.</i>
<i>You my children.</i>	<i>yūkl sāsum.</i>
<i>I will give it you (thing present),</i>	<i>la mun zaw klisūk lūkl.</i>
<i>I will give it you (gift not present),</i>	<i>la mun zaw klisī lūkl.</i>
<i>I come to you,</i>	<i>giāk un lūkl.</i>
<i>You are the one meant,</i>	<i>sū um kwayaus.</i>
<i>You are wanted,</i>	<i>ukiksda sūs.</i>

## (3.)

## 3RD PERS. SING. :—

<i>He will go,</i>	<i>lāklī (not present, nearly Latin ille.)</i>
<i>He will go,</i>	<i>lā klūk (present and near the person spoken to, Latin iste.)</i>
<i>He will go,</i>	<i>lā klīg (near the speaker, Latin hic.)</i>
<i>When he was going down,</i>	<i>yiks lā ī bunūtlila.</i>
<i>He is wanted by William,</i>	<i>ukiksda sūs William.</i>
<i>John said to him,</i>	<i>nikī John āk.</i>
<i>And then John said to him,</i>	<i>li John nīk yik.</i>
<i>I want it,</i>	<i>ukiksdin klāk.</i>
<i>It would perhaps be well to give him some,</i>	<i>īs mā ī gla ek kū zawlākuk.</i>

## (4.)

## 1ST PERS. PLUR. :—

<i>We will go,</i>	<i>la munts lā-kl (person addressed included).</i>
<i>We will go,</i>	<i>la munūhw lā-kl (person addressed not included).</i>
<i>When we see him or if we see him,</i>	<i>gil mī gints dūkwilāk.</i>
<i>Give it to us,</i>	<i>zaw tsūk giakunūhw, or kitsūk giakunūhw.</i>

N.B.—*Kī* is from *kīla* come; literally, "come it to us."

<i>He is going with us,</i>	<i>lā klūk giākunts or lā klūk gla wunts</i>
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## 2ND PERS. PLUR. :—

*You see to it,  
I come to you,  
I will take it from you,*

(5.)

sūhdākw umā dūkwātlāk.  
giākun lāhdākwūkl.  
uk-īd klin lah-dākwūkl.

## 3RD PERS. PLUR. :—

*They gave money to him,  
They asked him,  
He answered them,  
And said unto them,*

(6.)

lāh-dākw zaw sa dālā lāk.  
lāhdākw wuklāk.  
la nānākmi lāhdākwuk.  
kās niki lāhdākwuk.

N.B.—In ordinary conversation the Indians generally employ the Singular where we should expect the Plural form; e. g., Tell them, *nīk lākw*.

## (2) POSSESSIVE PRONOUNS.

<i>Mine,</i>	nūs.	<i>My,</i>	un, in.
<i>Yours,</i>	hūs.	<i>Your,</i>	ums, īs, ūs.
<i>His, her,</i>	hus.	<i>His,</i>	um, ī, as.
<i>Ours,</i>	nūs munts.		
"	nūs munūhw.		
<i>Yours,</i>	hūs dākw.	<i>Your,</i>	īs dākw.
<i>Theirs,</i>	hus dākw.	<i>Their,</i>	dākwās.

## EXAMPLES.

*It is mine,  
It is yours,  
It is his,  
It is ours (including speaker),  
It is ours (dispute implied),  
" (no dispute),  
It is yours,  
They are theirs,*

nūsūk.  
hūsmūk; hūsmī (if thing referred to not visible).  
husūk.  
nūs munts āk.  
nūs munūhwāk.  
nūs unūhwāk.  
hūs dākw mūk.  
hus dākwū kā.

*This is my house,  
" your "  
" his "  
" our "  
" do. "  
" your "  
" their "*

gia mun giukwik.  
gia ums giukwa.  
gia um giukw sī yīk.  
gia munts giukwik.  
gia munūhw do.  
gia ums giukw dākw gwā.  
gia um giukw dākw sī yīk.

*That is my house,  
" your "  
" his, her "*

yū mun giukwūk.  
yū ums giukwūk.  
yū um giukw sī.

*That is our house,  
" your "  
" their "*

yū munts giukwūk.  
yū ums giukw dākwūk.  
yū um giukw dākw sī.

*This house is mine,  
" " is yours.  
" " is his.  
" " is ours.  
" " is yours.  
" " is theirs.*

nūs ūk giukwa.  
hūs ūk giukwa.  
husūkwāk giukwa.  
nūsintsākw giukwa.  
hūs dākwūk giukwa.  
hus dākwūk wāk giukwa.

<i>Bring my hat,</i>	<i>kila tsin klatumtl.</i>
" <i>your hat,</i>	<i>kila tsis klatumtl-ūs.</i>
" <i>his hat,</i>	<i>kilats klatumtl-as.</i>
" <i>our hats,</i>	<i>kila tsints klī-klatumtl.</i>
" "	<i>kila tsinūhw klī-klatumtl.</i>
" <i>your hats,</i>	<i>kilāh dākw la tsis klī-klatumtl-ūs.</i>
" <i>their hats,</i>	<i>kilats klī-klatumtl dākwās.</i>

<i>Where is my axe ?</i>	<i>wizin sūbāyū ?</i>
" <i>is your axe ?</i>	<i>wīdis sūbāyūs ?</i>
" <i>is his axe ?</i>	<i>wīdī sūbāyaus ?</i>
" <i>is our axe ?</i>	<i>wīdints sūbāyū ?</i>
" "	<i>wīdunūhw sūbāyū ?</i>
" <i>is your axe ?</i>	<i>wīdis sūbāyūh dākwā ?</i>
" <i>is their axe ?</i>	<i>wī dī sūbāyūh dākwās ?</i>

<i>I will go to my father,</i>	<i>la mun lā-kl lā kun ūmpa.</i>
" <i>to your father,</i>	<i>la mun lā-kl lāk ausa,</i>
" <i>to his father,</i>	<i>la mun lā-kl lāk ūmpas.</i>
" <i>to our father,</i>	<i>la mun lā-kl lā kunts ūmpa.</i>
" "	<i>la mun lā-kl lākunūhw ūmpa.</i>
" <i>to your father,</i>	<i>la mun lā-kl lāk aus dākwā.</i>
" <i>to their father,</i>	<i>la mun lā-kl lāk ūmp dākwās.</i>

<i>This is my child,</i>	<i>gia mun ginānumg.</i>
" " <i>son,</i>	<i>gia mun kwanūkwig.</i>
" " <i>tree,</i>	<i>gia mun glosig.</i>
" " <i>sheep,</i>	<i>gia mun lāmādūgw.</i>
" " <i>hen,</i>	<i>gia mūn kākāūgw.</i>
" " <i>paddle,</i>	<i>gia mun tsīwāyūgw.</i>

NOTE.—The final *g* is from *gia* "this"; written fully, the last sentence would be, *gia mun tsīwāyū gwāda*.

<i>This is my father,</i>	<i>gia mun ūmp giada.</i>
<i>That is my child, son or daughter,</i>	<i>yū mun kwunūkwūk.</i>
" " <i>tree,</i>	<i>yū mun glosūk.</i>
" " <i>sheep,</i>	<i>yū mun lāmāda-wūk.</i>

<i>Go to his house,</i>	<i>hāgia lāk giukwas.</i>
<i>Go and mend your net,</i>	<i>hāgia kunsīduks kīglāyū.</i>
<i>Mending his net,</i>	<i>kunsā kīs kīglāyū.</i>
<i>Mending their nets,</i>	<i>kunsāh dākw kīs kī-kīglāyū.</i>
<i>They entreated him to leave their country,</i>	<i>lāh dākw hawāk-ulāk kā bowe sīs awīnāgwīs dākwās.</i>

### (3) RELATIVE PRONOUNS.

<i>Who, whom, that, which,</i>	<i>yikī da or kī da.</i>
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#### EXAMPLES.

<i>This is he of whom I spake,</i>	<i>yū mun kwayū wūk yik gin nīkīg.</i>
<i>He who believeth not,</i>	<i>yikī da kīsa ūkwīsā.</i>
<i>He who does what is right,</i>	<i>yikī da ukā kā aula.</i>
<i>He who was with you,</i>	<i>yikī da numūgwīs da yūs.</i>
<i>He whom thou lovest is sick,</i>	<i>kī da tlāhwila yūs zihkā.</i>

In the following sentences the Relative does not appear :—

*Where is the child who stole my hat ?*  
*Where is the book that I lost ?*

wī nī da ginānum a gilūtl-īd kun klatumtl ?  
 wī nī da kiadukwā un hyisā matsawa ?

#### (4) INTERROGATIVE PRONOUNS.

*Who ?*

ungwī ?

*Which ? what ?*

mās ?

##### EXAMPLES.

<i>Who are you ?</i>	ungwās ?	<i>What are you doing ?</i>	mā zaus ?
<i>Who told you ?</i>	ungwī nīkia ūkl ?	<i>What have you found ?</i>	māsūs kīk ?
<i>Which do you desire ?</i>	wī dīs ūkīksdasawa ?	<i>What is the news ?</i>	māsa zikialum a ?
<i>What do you want ?</i>	māsīs ūkīksdasawa ?	<i>What are you doing ?</i>	māsīs ūksūkw dākwa ?
<i>To whom shall we go ?</i>		kā ungwī sunūhw la ā sa ?	

NOTE.—Generally all sentences that ask questions end in *a*.

#### (5) INDEFINITE ADJECTIVE PRONOUNS.

*None, not any,*

*Has no one arrived ?*

*Have you any apples ?*

kīyos.

kīyos ma giāka ā ?

kīyos as ābul̄s ? or ābul̄s nūkw mas ?

NOTE.—The latter sentence means, “If you have none, I will give you some.” It is rude to say *kīyos*, “I have none,” in reply to an appeal. Rather say, “Whence shall I get it ?” *kun wīzīsī kī ?* Or, “Where shall it come from ?” *kā wesī geh-īdī*.

##### EXAMPLES.

<i>All,</i>	nāhwa.
<i>Make disciples of all nations,</i>	disciples sīlāk nāhwā tīlkwālāklaya.
<i>Go into every house,</i>	la itla lākā nāhwā giukw.
<i>Some,</i>	wa-ūkw.
<i>Who are on my side ?</i>	ungwun wa-ukw ?
<i>Some say (that thou art) John the Baptist, some</i>	nīkī da wa-ūkw John kā Baptist, nīk tī da wa-ūkw Elias,
<i>Elias, and others Jeremiah,</i>	wa nīk tī da wa-ūkw Jeremiah.
<i>Diverse,</i>	ūgwila.
<i>I have no other,</i>	kīyosin ūgwila.
<i>Other,</i>	num.
<i>Where is the other ?</i>	wī nī da num.
<i>Such, similar,</i>	hī kwix, numāhyis.
<i>I never saw such a man before,</i>	hī mun ātlī num pun dūkwilāk bagwānum a hī kwix.
<i>It is not like it,</i>	kīs numāhyis.

## IV.—VERB.

A verb is used, for the most part, to affirm some kind of action. Actions take place under a great variety of circumstances; particularly in reference to the time at which they occur. Hence there is a great number of relations which we have to express by the verb. For this reason in every language it has by far the greatest variety of inflexion of all the different parts of speech.

VOICE.—If we consider an action on the one hand as expressing what anything does or on the other hand as expressing what is done to it, we indicate these differences by the Active and Passive Voices, as :—

ACTIVE.—I strike, *muhīdīn*;

PASSIVE.—I am struck, *muhīdītsuvim*.

MOOD.—If we consider the mode or manner in which an action is done, we may consider it either as an actual reality, or as a possibility, or as a command. The expression of these different circumstances gives rise to what are called “moods” The Kwagiutl verbs have four moods.

(1.) INDICATIVE MOOD.—This simply affirms or denies. He will go, *lā klī*; he will not go, *kīs klī lā-klī*.

(2.) SUBJUNCTIVE MOOD.—Verbs in this mood form part of a dependent sentence and are preceded by a conjunction, such as, “in order that,” “that,” “if”; they are preceded or followed by another verb not in the subjunctive.

## EXAMPLES.

<i>That I may believe it,</i>	<i>kun ūkwisik.</i>
<i>I have come to hear you, that I may believe it,</i>	<i>giakmun hūklilūkl kun ūkwisik.</i>
<i>That you may believe me,</i>	<i>kās ūkwisa ūs giakun.</i>
<i>If I go there,</i>	<i>kunklū lā lāk.</i>
<i>If I had gone there,</i>	<i>gil um lāks din lā lāk.</i>

(3.) CONDITIONAL OR POTENTIAL MOOD.—This implies the possibility of an action under a certain condition, expressed by another verb in the subjunctive, as, I may go, *la um lākun*. The signs of this mood are *lāk* and *lāks*.

## EXAMPLES.

<i>I may go if my father goes,</i>	<i>la um lākun, kū lā lākun ūmpa.</i>
<i>I might have been hurt,</i>	<i>lā lāks din yilkwā or lā hyis lāksdin yilkwā.</i>
<i>If I had gone there, I might have been injured,</i>	<i>gil um lāks din lā lāk, lā lāks din yilkwā lāk.</i>
<i>He may dance,</i>	<i>yikwā lāk.</i>
<i>It may rain,</i>	<i>yūgwā lāk.</i>
<i>It might have rained,</i>	<i>yūgwā lāksdi.</i>
<i>It looks like rain,</i>	<i>yūgwā hyis lāk.</i>
<i>It will perhaps rain,</i>	<i>yūgwā gianum klī.</i>

Here we have the indicative with an adverb:—

<i>I can go (if the power to go was denied).</i>	La um lākun,
<i>I can imprison you,</i>	wulā lākun klūkl.
<i>Do you know that I can imprison you?</i>	kauklila zau masik gin wuli lāk gūkla?
<i>Do you know that I have power to kill you?</i>	kauklila zau masik gin tliā masi lāk gūkla?

NOTE.—The syllable *zau* expresses anger and impatience.

(4.) IMPERATIVE MOOD.—This is used when a command is expressed.

#### EXAMPLES.

<i>Speak,</i>	yakuntalāla.
<i>Speak to him,</i>	yākuntāla lāk.
<i>Take it away,</i>	ukīdagiākw or ukīdākw.

PARTICIPLES.—A participle is a part of the verb and receives its name from the fact that it participates in the nature of the adjective and the noun. *Īnāyī* is the sign of the Kwagiutl participle. Go, *lā*; going, *lā-īnāyī*. It is sometimes added to the negative adverb instead of the verb. Thus, “for his not going home,” would be: “for his not-ing go home,” *kū is īzīnāyī lā nenākw*. *Īnāyī* is often added to a noun and then it is equivalent to “kind of,” e.g., Which child? *māsī ginānum īnāyas?*

TENSES.—If we take into consideration the time at which an action is performed, and express it, this gives rise to the employment of what are called “tenses,” which help us to point out any action as being either Present, Past or Future, as: I strike, *muhīdīn* or *muhyīn*; I struck, *muhīdikdīn*; I will strike, *muhīd-klīn*. *Kd* is the sign of the Past Indicative, and *ksd* of the Past Subjunctive and Conditional; *kl* is always the sign of the Future (*kl* is also the termination of the personal pronoun, 2nd person singular). The Present tense is often used for the Past if the action is recent, e.g., “he struck me to-day,” *muhīdī giakun klā kwā nālā*. Most tenses have two forms, the ordinary and the emphatic, e.g., “I have been,” *lākdīn*; but if this is denied or you wish to state the fact stronger, *la umkdīn*, “I did go,” or, “but I have been.” In the same manner, “I will go,” *lā klīn* or *la um klīn*.

NUMBER AND PERSON.—The numbers are two in every tense and mood, the Singular and the Plural. Each number has three persons; the 1st person is the person speaking; the 2nd is the person spoken to; and the 3rd is the person spoken of. The subjects of verbs are nouns or pronouns. Most of the personal pronouns are affixed to the verb. They sometimes both precede and follow the verb, but then they form separate words, e.g., “that I may come to you,” *kun giakī lūkl*.

## (1.) CONJUGATION OF VERBS.

The conjugation of a verb is a written display or recital of its different voices, moods, tenses, participles, numbers and persons. I shall now proceed to conjugate the verb to "strike," *muhyā*.

NOTE.—After the first tense the English equivalent of the tense will only be given once, the difference of person in the tenses being indicated by the numbers 1, 2, 3. The notes in brackets (1), (2), &c., refer to the "Notes on the Verb" at the end of the conjugation, (pp. 86, 87.)

**Conjugation I.**THE VERB *Muhyā* : Strike.

## ACTIVE VOICE.

## INDICATIVE MOOD.

## PRESENT TENSE.

*I strike* (many times).

SINGULAR.		PLURAL.	
1. <i>I strike</i> ,	Muhy -	1. <i>We strike</i> ,	Muhy -
2. <i>Thou strikest</i> ,		2. <i>You strike</i> ,	
3. <i>He strikes</i> ,		3. <i>They strike</i> ,	
	{ — in		{ ints or inūhw
	{ — as		{ āh dākws
	{ — ā		{ āh dākwi

## PAST TENSES.

(1.)	
<i>I strike or struck</i> (once, no particular time). (1)	
SING. 1.	Muhīd -
2.	
3.	
	{ — in
	{ — is
	{ — ī
PLUR. 1.	do.
2.	
3.	
	{ ints or inūhw
	{ ih dākws
	{ ih dākwi

(3.)	
<i>I struck him</i> (to-day).	
SING. 1.	Muhīdik -
2.	
3.	
	{ din klāk
	{ dis ik
	{ dīk
PLUR. 1.	Muhīdikdintsāk or dinūhwāk, &c.

(5.)	
<i>I struck</i> (two weeks or months ago).	
SING. 1.	Muhīdih -
2.	
3.	
	{ īdin
	{ īdis
	{ īdī
PLUR. 1.	do.
2.	
3.	
	{ īdints or īdinūhw
	{ dākwidis
	{ dākwi

(2.)	
<i>But I did strike him</i> (emphatic form).	
SING. 1.	Muhī -
2.	
3.	
	{ damun klāk
	{ isik
	{ ik
PLUR. 1.	Muhīd-intsāk or inūhwāk

(4.)	
<i>But I did strike him</i> (emphatic form). (2)	
SING. 1.	Muhīda-umk -
2.	
3.	
	{ din klāk
	{ disik
	{ dīk
PLUR. 1.	Muhīda-umk - dintsāk or dinūhwāk, &c.

(6.)	
<i>But I did strike</i> (emphatic form, 2 weeks or even 6 months ago).	
SING. 1.	Muhīdihīda -
2.	
3.	
	{ mun
	{ ums
	{ mī or um (3)
PLUR. 1.	do.
	{ munts
	{ munūhw

*Muhyā*: Strike.

ACTIVE. (Continued.)

INDICATIVE. (Continued.)

PAST TENSES. (Continued.)

(7.)

*And then I struck him* (used in narration).

SING. 1.	Lin	}	muhīduk
2.	Las		
3.	Lī		
PLUR. 1.	Lints or linūhw	}	do.
2.	Lāhdākws		
3.	Lāh dākwi		

(8.)

*And then I struck him* (used in narration). (1)

SING. 1.	La mī	{	sin	}	muhīduk
2.			sis		
3.			sī		
PLUR. 1.	La mī sints muhīduk, &c.				

(9.)

*I struck him* (yesterday). (5)

SING. 1.	Muhīdūtl -	{	inklāk
2.			tsik
3.			ik
PLUR. 1.	do.	{	intsāk or inūhwāk
2.			tsik
3.			dākwütlik

(10.)

*I did strike him* (yesterday). (6)

(Emphatic form.)

SING. 1. La mūtlin muhīduk, &amp;c.

(11.)

With varied object. (*He struck—*.)

SING. <i>Thee,</i>	Muhīdūtl -	{	lūkl
<i>Him</i>			ik
PLUR. <i>Us,</i>	do.	{	giākunts
<i>"</i>			giākunūhw
<i>You,</i>			lāh dākwūkl
<i>Them,</i>			lah dākwuk

(12.)

Same tense some time ago. (*He struck—*.)

SING. <i>Me,</i>	Muhīdihīdī -	{	giākun
<i>Thee,</i>			lūkl
<i>Him,</i>			k
PLUR. <i>Us,</i>	do.	{	giākunts
<i>"</i>			giākunūhw
<i>You,</i>			lāh dākwūkl
<i>Them,</i>			lah dākwuk

(13.)

*I wish I had struck him.*

SING. 1.	Muhīdikdalā -	{	- hyin klāk or klākī or klāk
2.			(person present)
3.			- hyūs āk <sup>1</sup>
			- hyik, &c.

FUTURE TENSES.

(1.)

*I will strike him.*

SING. 1.	Muhīd -	{	klin klāk
2.			klis ik
3.			klīk
PLUR. 1.	do.	{	klintsāk or klinūhwāk
2.			dākw klisik
3.			" klīk

(2.)

*But I will strike him* (emphatic form).

SING. 1.	Muhīda um -	{	klin klāk
2.			klisik
3.			klīk, &c.

(3.)

*I will go and, or am going to, strike him.*

SING. 1. Lā klin	}	Muhīd klak	PLUR. 1. Lā klints or lā	}	Muhīd klak
2. Lā klis			klinūhw		
3. Lā klī			2. Lāh dākw klis		
			3. Lāh dākw klī		

<sup>1</sup> Another way of saying "I wish you had struck him" would be *muhīdikdalak*.



FUTURE TENSES. (*Continued.*)

(4.)

With varied object. (*He will strike.—*)

SING. <i>Me,</i> <i>Thee,</i> <i>Him,</i>	Muhīdikl -	$\left\{ \begin{array}{l} \text{giākun} \\ \text{lūkl} \\ \text{ik} \end{array} \right.$	PLUR. <i>Us,</i> <i>You,</i> <i>Them,</i>	do.	$\left\{ \begin{array}{l} \text{giākunts or giākunūhw} \\ \text{lāh dāk wūkl} \\ \text{lāh dāk wuk} \end{array} \right.$
---	------------	--	---	-----	--

## IMPERATIVE MOOD.

(1.)

SING.	Muhyāla, <i>strike.</i> Muhīdāk <sup>1</sup> <i>or</i> muhīdagiāk <sup>1</sup> , <i>strike him.</i> Muhīdāhyūk, <i>let him strike.</i>
PLUR.	Muhīdāhyintsāk, <i>let us strike him.</i> Muhīdih dāk w lagiāk <sup>1</sup> , <i>strike him (you plural).</i> Muhīdih dāk w lāhyūhwāk, <i>let them strike him.</i>

(2.)

Muhīda giākun, <i>strike me.</i> Muhīda giākunūhw, <i>strike us. (')</i>
---

## SUBJUNCTIVE MOOD.

## PRESENT TENSE.

(1.)

*That I may strike him.*

SING.	1. Kun muhīdikw 2. Kās muhīda ūsāk w 3. Kā muhīdī sikw
PLUR.	1. Kunts muhīdikw 2. Kās muhīdih dākwa ūsāk w 3. Kā muhīdih dāk wī sik

(2.)

*Lest I should strike him.*

SING.	1. āklin 2. āklas 3. āklī	} muhīdalākukw
PLUR.	1. āklinuhw 2. āklāh dākwas 3. āklāh dāk w	

(3.)

*If I strike him.*

SING.	1. Kunklū 2. Kāsū 3. Kū	} muhīdalākuk
PLUR.	1. Kuntsū 2. Kāh dākwsū 3. Kāh dāk wū	

## PAST TENSES.

(1.)

*If I had struck him.*

SING. 1.	Kunklū	}	muhīda lakuk	
2.	Kāsū			
3.	Kū			
PLUR. 1.	Kuntsu			
<i>Or,</i>				
SING. 1.	Gil um lāks	din	}	muhīduk
2.		dis		
3.		dī		
PLUR. 1.	dints			

(2.)

*When I had struck him.*

SING.	1. Gilhīda 2. Gilhīda 3. Gilhīda	$\left\{ \begin{array}{l} \text{mun} \\ \text{ums} \\ \text{um or mī} \end{array} \right\}$	} muhīduk
PLUR.	1. Gilh dāk w īda 2. Gilh dāk w īda 3. Gilh dāk w īda	$\left\{ \begin{array}{l} \text{ums} \\ \text{um or mī} \end{array} \right\}$	

<sup>1</sup> *w* added because person to be struck present.

*Muhyā* : Strike.

ACTIVE. (Continued.)

SUBJUNCTIVE. (Continued.)

PAST TENSES. (Continued.)

(3.)

With varied object. (*He might have struck —.*)

<i>Me,</i>	Muhīdi -	{	lāksdī giākun
<i>Thee,</i>		{	lāksdī lūkl
<i>Him,</i>		{	lāksdik
<i>Us,</i>		{	lāksdī giākunts

FUTURE TENSE.

*I shall have struck him.*

SING.—1.	Lā lākun	}	muhīda lāk uk
2.	Lā lāks		
3.	Lā lākī		
PLUR.—1.	Lā lākunūkw		
3.	Lāhdākw lāk		

## CONDITIONAL MOOD.

PRESENT TENSES.

(1.)

*I may strike him.*

SING. 1.	Muhīda -	{	lākun klāk
2.		{	lāksik
3.		{	lākik

(3.)

With varied object. (*He may strike —.*)

1. <i>Me,</i>	Muhīda lāk -	{	giākun
2. <i>Thee,</i>		{	lūkl
3. <i>Him,</i>		{	ik
1. <i>Us,</i>		{	giākunts

(2.)

*I may strike him (emphatic form.)*

SING. 1.	Muhīda um -	{	lākun klāk
2.		{	lāksik
3.		{	lākik
PLUR. 1.	Muhīda um lākunuhwāk		

(4.)

*I may perhaps strike him.*

SING. 1.	Muhīda gianums -	{	tā klin klā kī
2.		{	tākl tsī kī
3.		{	tā klī kī
PLUR. 1.	Muhīda gianums tā klinūhwā kī.		

PAST TENSES.

(1.)

*I might have struck him.*

SING. 1.	Muhīda um -	{	lāksdik
2.		{	lāksdis sīk
3.		{	lāksdin klāk
PLUR. 1.	3.	{	lāks dintis āk
3.		{	muhīdih dākw um lāks dik.

(2.)

*I may perhaps have struck him.*

SING. 1.	Is gianuma	{	wīsin	}	muhīdihīda um kī
2.		{	wīsis		
3.		{	wīsī		

(3.)

With varied object. (*He might have struck —.*)

<i>Me,</i>	Muhīda -	{	lāksdī giākun
<i>Thee,</i>		{	lāksdī lūkl
<i>Him,</i>		{	lāksdik
<i>Us,</i>		{	lāksdī giākunts

## FUTURE TENSE.

*I shall have struck him.*

SING.	1. Lā lākun	} muhīda lāk uk.
	2. Lā lāks	
	3. Lā lākī	
PLUR.	1. Lā lākunūhw	}
	3. Lāhdāk w lāk	

## INFINITIVE MOOD.

Yāksamī da muhyā. *It is wrong to strike.*

## PARTICIPLE.

Muhīdā-īnāyī. *Striking.*

## PASSIVE VOICE.

## INDICATIVE MOOD.

## PRESENT TENSES.

(1.)		<i>I am struck (action not expected).</i>	
SING.	1.	Muhīd -	tša wun
	2.		tsūs
	3.		tša wī
PLUR.	1.	Muhīd -	tša wunts
	2.		tsūs or
			tsūh dāk w
	3.		tsūh dāk wī

(2.)		<i>I am now struck (action expected).</i>	
SING.	1.	Lamun	} muhīd tša wa
	2.	La ums	
	3.	La { mī <sup>1</sup> um <sup>2</sup> mūk <sup>3</sup>	
PLUR.	1.	La munts	}
	3.	La { mī um mūk	

(3.)		<i>I am struck by James.</i>	
SING.	1.	Muhīd -	tsu wun klas James
	2.		tsū sīs James
	3.		tsūs James
PLUR.	1.	Muhīd -	tša wunūhwas James
	2.		tsūh dāk wīs James

(4.)		<i>I am</i>	
SING.	1. Muhīd	tsa wun klasin ump	} struck { my your father
	2.	tsū sīs aus	
	3.	tsa wīs <sup>4</sup> aus	

## (5.)

*You are made to strike.*

SING.	2.	Muhīdā mad	sūs
	3.		sa wī
PLUR.	1.		sa wunts

If the speaker does not see those struck.

If the speaker sees them but they are not near.

<sup>3</sup> If those struck are standing near the speaker.<sup>4</sup> Written fully this would be *muhīd tsa wī yīs aus*.

*Muhyā*: Strike.

## PASSIVE. (Continued.)

## INDICATIVE. (Continued.)

## PAST TENSES.

(1.)

*I was struck* (action occurred to-day).

SING. 1.	din
2.	dis
3.	dī
PLUR. 1.	dunūhw
2.	dākw dis
3.	dākw dī

Muhīd tsūk

(2.)

*I was struck* (action 4 days or 4 months ago).

SING. 1.	din
2.	dis
3.	dī
PLUR. 1.	dints

Muhīd tsu lwī

(3.)

*I was struck* (action yesterday or long ago).

SING. 1.	wūtlīn
2.	wūtlis
3.	wūtlī
PLUR. 1.	wūtlints
2.	Muhīd tsūk dākw wūtlī.

Muhīd tsu

(4.)

*I was struck by James.*

SING. 1.	tsu wūtlīn or	klas James
2.	tsūk din	
3.	tsūk disīds James	
PLUR. 1.	dis James	
	dintsas James	

Muhīd

Muhīd tsūk

(5.)

*I have been struck by William* (action not expected, but recent).

SING. 1.	tsū	zin klas William
2.	sīs	William
3.	wis	
PLUR. 1.	tsa	wunūhwas William

Muhīd

(6.)

*I have now been struck* (action expected).

SING. 1.	din	
2.	dis	muhīd tsa wa
3.	dī	
SING. 1.	din	
2.	dis	muhīd tsūs Charles
3.	dī	

La umk

La umk

(7.)

*And then I was struck.*

SING. 1.	Lin
2.	Las
3.	Lī
PLUR. 1.	Lints

muhīd tsa wa

Lin muhīd tsūs Charles. *And then I was struck by Charles.*

## FUTURE TENSES.

(1.)

*I shall be struck.*

SING. 1.	klin
2.	klis
3.	kli
PLUR. 1.	klints
2.	dākw klis
3.	dākw kli

Muhīd tsū

(2.)

*I shall be struck by James.*

SING. 1.	klin klas James
2.	klis
3.	klis
PLUR. 1.	klintsas

Muhīd tsu

James

(3.)

*But I shall be struck* (emphatic form).

SING. 1.	Muhīd tsū um	klin
3.		kli

## IMPERATIVE MOOD.

SING. 2.			{	la— <i>Be struck (thou)</i>
3.		tsū	{	hyī— <i>Let him be struck</i>
PLUR. 1.	Muhīd		{	hyints— <i>Let us be struck</i>
2.		tsūh dākw la—		<i>Be struck (you)</i>
3.		"		hyī— <i>Let them be struck</i>

## SUBJUNCTIVE MOOD.

La lā hyin kun muhīd tsa wī lāk  
*Let me go that I may be struck.*

*That I may be struck. (Positive form).*

SING. 1.	Kun			{	lak
2.	Kās			{	lākūs
3.	Kā			{	lāks
PLUR. 1.	Kunts or Kunūhw			{	lāk

(2.)

*That I be not struck (negative form).*

SING. 1.	Kun	kīsī			
2.	Kās	kīsa ūs			
3.	Kā	kīsīs			
PLUR. 1.	Kunts	kīsī			

muhīd tsa wa.

(4.)

*I cannot avoid being struck.*

SING. 1.	Kun	īsī			
2.	Kās	īsa ūs			
3.	Kā	īsīs			

muhīd tsa wa

(6.)

*If I am struck.*

SING. 1.	Kunklū	muhīd tsū lāk			
2.	Kasū				
3.	Kū				
PLUR. 1.	Kunūhwū				
2.	Kāh	dākw sū			
3.	Kāh	dākwū			

muhīd tsū lāk

(3.)

*That I may not be struck.*

SING. 1.	Kun	kīsī lākun			
2.	Kās	do. lākūs			
3.	Kā	do. lāks			
PLUR. 1.	Kunts	kīsī lāk			

muhīd tsū lāk

(5.)

*Or I shall be struck.*

SING. 1.	ā-klin				
2.	ā-klas				
3.	ā-kli				
PLUR. 1.	ā-klinuhw				

muhīd tsū lāk.

(7.)

*If I had been struck.*

SING. 1.	Kunklū				
2.	Kāsū				
3.	Kū				
PLUR. 1.	Kuntsū or kunūhwū				

muhīd tsū lāksd

NOTE.—*Kuntsū* implies that the person spoken to is included *kunūhwū* that he is not.

(8.)

*If I had been struck.*

SING. 1.					
2.					
3.					
PLUR. 1.					

Gil um

{ lāksdin  
lāksdis  
lāksdī  
lāksdints }

muhīd tsa wa

## CONDITIONAL MOOD.

## PRESENT TENSES.

(1.)

*I may be struck.*

SING. 1.					
2.					
3.					
PLUR. 1.					
3.					

Muhīd tsū um

{ lālun  
lāks  
ākī }

lākunts

Muhīd tsūh dākw um lākī

(2.)

*I may be struck by the Indians.*

[*Um* omitted, statement not as strong.]

SING. 1.					
2.					
3.					
PLUR. 1.					
2.					
3.					

Muhīd tsū lākun kla sa bākwum

Muhīd tsū lāk sīts bākwum

Muhīd tsū { lākī sa bākwum

lākuntsa sa bākwum

{ lāk sītsa bākwum  
lākī sa bākwum }

*Muhyā* : Strike.

PASSIVE. (Continued.)

CONDITIONAL. (Continued.)

## PRESENT TENSES. (Continued.)

	(3.)	
	<i>I may perhaps be struck.</i>	
SING. 1.		klin
2.		klis
3.	Muhīd tsū gianums tā	kli
PLUR. 1.		klinūhw
2.	Muhīd tsūh dākw gianums tā klis	

## PAST TENSES.

(1.)  
*I might be struck.*  
 Muhīd tsū hwišī lāk gin

(2.)  
*I should have been struck.*  
 Muhīd tsū um lāksdīn  
 Muhīd tsū um lāksdis

## FUTURE TENSE.

	<i>I shall be struck.</i>	
SING. 1.	Lā lā kun	} muhīd tsū lak
2.	Lā lāks	
3.	Lā lākī	

## INFINITIVE MOOD.

Kīsunūhw nīk kunūhw muhīd tsa wa  
*We do not wish to be struck.*

NOTES ON THE VERB *Muhyā*.

(1.) This tense is the Present form, and is similar to the imperative mood, but it is generally employed to narrate an action just past.

*He struck me,* muhīdī giākun.

*He struck us* (persons addressed included), muhīdī giākunts.

*We strike him,* muhyānūhwāk.

*He struck him,* muhīdīk.

*He struck us* (person addressed not included), muhīd gākunūhw.

*We struck him,* muhīdīnūhwāk.

(2.) The emphatic form of the Past tense is also used when a person, having been sent to strike another, returns saying, "I have struck him."

(3.) In variety (4) of the Past tense, the 3rd person singular has two forms, *muhīdihāda-mī* and *-um*. The former is used if the one who struck the blow is unseen; if seen, the latter is used.

(4.) There are many varieties of form. He told me to strike him and I struck him, *nīk kun muhīdīk, la mī sin muhīdūk*. *Lin* is sometimes used for "I have" or "I had." *Lin mātl punalā lāk Victoria*, "I have been twice to Victoria." *Lin mātl unkāla lāk yalis kīs mā ī giākī William*, "I had been two seasons at Alert Bay before William came."

(5.) Whenever an action expressed by the verb occurred yesterday or a very long time ago, the letters *ūtl* appear before the pronoun.

(6.) If you wish actually to say the word “yesterday,” add the word *tlinswātl*.

(7.) To this tense of the Imperative there can be no second form to the 1st person plural. I have already stated that the termination *unts* or *ints* shows that the person addressed is included, and that the termination *inūhw* or *unūhw* that he is not. I shall not in future give both forms, and only occasionally the 2nd or 3rd persons plural. The singular form is nearly always employed in conversation. Let me here state that there are several terminations of the 3rd person singular, e.g., *um* and *mī*; *um* shows that the doer of the action is visible, *mī* that he is far off and not in sight; so also *ī* and *āk*, the latter is used when the actor is present. So also the 3rd person plural *dākw* if the subject is visible, *dākwī* if he is not.

(8.) Examples of the Subjunctive mood:—

Dāhīdākw kun muhīdikw, *hold him that I may strike him.*  
 Kun **kī**sī muhīduk, *that I may not strike him.*  
 Kun **ī**sī muhīduk, *how can I help striking him*  
 Ukīdākw kās lā ūsas ūk, āklin muhīdalākukw, *take him away or I will strike him.*  
 Nīkī kun umpā kgin hyisā masī gia hunglumk des, *he told my father that I lost his gun.*  
 Nīkī kun umpā kgin muhīdī giāk, *he told my father that I struck him.*  
 Nīkī kun umpāks sū mā īk muhīduk, *he told my father that you struck him.*

Nīkī kun umpāk gints muhīdī giāk, *he told my father that we struck him.*  
 Kunklū muhīda lākūkl, *if I strike you.*  
 Kāsū muhīda lāk giākunūhw, *if you strike us.*  
 Kū muhīda lākst giākun, *if he had struck me.*  
 Kū muhīda lāksdūkl, *if he had struck you.*  
 Gil um lāks dis muhīd giākun, *if you had struck me.*  
 “ di “ giākunts, *if he had struck us.*  
 Gilhīda mun muhīdūkl, *when I had struck you.*  
 Gilhīda um (or mī) muhīd giākunūhw, *when he had struck us.*

(9.) The following are examples of the Conditional mood:—

Lāk-zum lākun, *I may be put on board.*  
 Lak-zum lāksdin, *I might have been put on board.*  
 Muhīda um lāks dīn klāk, kāsū **kī**s lakst bulā giākun, *I might have struck him if you had not forbidden me.*  
 Muhīda gianum lākā wīsin klak kunklū lā lāk lākā, *I might not perhaps strike him if I go there.*

Kīs lāksdin dūkwāklilākī, kāsū es lāksd wekul giākun, *I might not have seen her if you had not commanded me (to go to her understood).*  
 Dūkwāklilā gianum lākā wīsīkī, kū lā lāk lāk, *he may not perhaps see her if he goes there.*

(10.) Sometimes *līn* is equivalent to “I have been.” *Līn nānumāk unkīla tlūhwīla sīn kunum*, “I have been loved by my wife nine seasons.”

(11.) When a boy, who knows he has done wrong, is told that he will be punished, he replies, *kun īsī wīs hīsā sū*, “I cannot escape being beaten,” or “I ought to be beaten.”

## Conjugation II.

The verbs belonging to this conjugation do not differ from the previous verb in the Active voice, but are quite different in the Passive. The following is a list of some of them:—

### ACTIVE.

Dūkwilīn } *I see*  
 Dūkwāklilīn }  
 Wūklilīn, *I hear*  
 Pihwilīn, *I feel*  
 Kauklilīn, *I know*  
 Ehwilīn, *I desire*  
 Klisilīn, *I hate*  
 Mulkwilīn, *I remember*

### PASSIVE.

Dūkwitlīn } *I am seen*  
 Dūkwāglitlīn }  
 Wūglitlīn, *I am heard*  
 Piūtīn, *I am felt*  
 Kauglitlīn, *I am known*  
 Ayūtīn, *I am desired*  
 Klizitlīn, *I am hated*  
 Mulgwitlīn, *I am remembered*

It will be observed that most of these are verbs of perception. The verb “to love”

is irregular; *tlāhwila-nūkwum*, I love; *tlāhwilin*, I am loved. It omits *nūkw* throughout the Passive voice.

I shall now conjugate the verb "to see," but as its positive form in the Active voice is similar to *muhyā* already given, I shall only conjugate its negative form until we reach the Passive voice.

The verb "to see" has two forms, *dūkwila* and *dūkwiklila*. They are found in every mood and in both voices. The latter form, *dūkwiklila*, is used if the object seen quickly disappears, or if it is seen for the first time. *Dūkwila* is the proper word for immoveable objects, such as a tree; but *dūkwiklila* for a passing steamship.

## THE VERB *Dūkwila*: See

### ACTIVE VOICE.

#### INDICATIVE MOOD.

##### PRESENT TENSES.

(Negative Form).

*I do not see him.*

SING. 1. <b>K</b> isin	}	<i>dūkwilāk</i>
2. <b>K</b> isis		
3. <b>K</b> isī		
PLUR. 1. <b>K</b> isints or <b>K</b> isunūhw		
2. <b>K</b> is dākws		
3. <b>K</b> is dākwi		

(NOTE.—*Dūkwōklilākī* can be substituted for *dūkwilākī*).

##### PAST TENSES.

(1.)

*I did not see (yesterday or long ago).*

SING. 1. <b>K</b> is wūtin	}	<i>dūkwilāk.</i>
2. <b>K</b> is wūtl-ts		
3. <b>K</b> is wūti		
PLUR. 1. <b>K</b> is wūtinūhw		
<b>K</b> is wūtin dūkwilūkl, <i>I did not see you.</i>		

(3.)

*I have not or did not see him (long time ago).*

SING. 1. <b>K</b> is idin	}	<i>dūkwilāk</i>
2. <b>K</b> is idis		

(5.)

With varied object (*He did not see—*)  
(Yesterday or long ago.)

<i>Me</i>	}	<b>K</b> is wūti (or wūtl)	{	<i>dūkwila</i> giakun
<i>Thee</i>				<i>dūkwila</i> lūkl
<i>Him</i>				<i>dūkwilāk</i>
<i>Us</i>				<i>dūkwila</i> giakunts

(2.)

*I did not see him (one week ago).*

SING. 1. <b>K</b> is din	}	<i>dūkwilāk.</i>
2. <b>K</b> is dis		
3. <b>K</b> is dr		
PLUR. 1. <b>K</b> is dinūhw		
<b>K</b> is din dūkwilūkl, <i>I did not see you.</i>		

(4.)

(Present used as Pluperfect).

*I had not seen him.*

**K**isin—*dūkwilākī.*

(6.)

(One week or month ago.)

<i>Me</i>	}	<b>K</b> is idī dūkwila	{	<i>giakun</i>
<i>Thee</i>				<i>lūkl</i>
<i>Him</i>		<b>K</b> is idik dūkwilak		
<i>Us</i>		<b>K</b> is idī dūkwila giakunts		



## FUTURE TENSE.

(1.)		(2.)	
<i>I shall not see him.</i>		<i>With varied object (He will not see —.)</i>	
SING. 1.	<b>K</b> is klin	<i>Me</i> <i>You</i> <i>Him</i> <i>Us</i>	<b>K</b> is klī { dükwilā-kl giakun dükwila klūkl dükwila kluk (or klukī) dükwila-kl giakunts
2.	<b>K</b> is klis		
3.	<b>K</b> is klī		
} dük wilā-kl kī			

## IMPERATIVE MOOD.

(1.)		(2.)							
SING. Kwās	} dükwiduk {	} Kwālā dükwātī {	} giakun, giakunūhw, Do not look at {						
Kwāsūk				} {	} me. us.				
PLUR. Kwāsints or						} {	} {		
Kwātīlasints								} {	} {
Kwātīl dāk w las									
Do. lasūk	} {	} {	} {						
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## SUBJUNCTIVE MOOD.

## PRESENT TENSE.

<i>If I do not see him.</i>	
SING.—1. Kunklū	} <b>K</b> is lāk dükwilā lākuk.
2. Kāsū	
3. Kū	
PLUR.—1. Kunūhwū	

## PAST TENSE.

<i>If I had not seen him.</i>	
SING.—1. Kunklū	} <b>K</b> is lāk dükwāklilā lāksduk
2. Kāsū	

## MISCELLANEOUS TENSES.

(1.)	(4.)
<b>K</b> isīn nīk kun dūkwilī kī, <i>I do not wish to see him.</i>	<i>That I do not see him.</i>
<b>K</b> is nīk kās dūkwākīlī giakun, <i>he does not wish to see me.</i>	SING. 1. Kun <b>k</b> isī
	2. Kās <b>k</b> isā ūs
	3. Kā <b>k</b> isīs
(2.)	} dūkwākīlākī.
<b>K</b> isīdin nīk kun dūkwīlik or dūkwīlikī, <i>I did not wish to see him (last year).</i>	
<b>K</b> is wūtīn nīk kun dūkwīlik, <i>I did not wish to see him (yesterday).</i>	(5.)
	<i>That I may not see him.</i>
(3.)	SING. 1. Kun <b>k</b> isī lākun
<b>K</b> is wūtīnīk kās dūkwākīlī giakun, <i>he did not wish to see me.</i>	2. Kās <b>k</b> isī lākūs
	3. Kās <b>k</b> isī lāks
<b>K</b> is īdī nīk kas dūkwākīlī giakun, <i>he did not wish to see me.</i>	} dūkwākīlākī.

## CONDITIONAL MOOD.

(1.)	
<b>K</b> is lākun dükwāklilā lāk kī kunklū lā lāk lāk, <i>I may not see him if I go there.</i>	
<b>K</b> is lāks dükwāklilā lāk kī kāsū lā lāk lāk, <i>You may not see him if you go there.</i>	

*Dūkwila*: See.

## ACTIVE. (Continued.)

## CONDITIONAL. (Continued.)

(2.)		(3.)	
<i>I may perhaps not see him.</i>		<i>I might not perhaps see her if I go.</i>	
SING. 1.	Dūkwāklilā gianum kla	SING. 1.	Dūkwāklilā gianum lākā
2.		2.	
3.		3.	
PLUR. 1.		PLUR. 1.	
	$\left\{ \begin{array}{l} \text{wīsin klā kī} \\ \text{sūsā kī} \\ \text{wīsī kī} \\ \text{wīsunūhwā kī} \end{array} \right.$		$\left\{ \begin{array}{l} \text{wīsin klā kī, kunklu} \\ \text{[lā lāk lāk]} \\ \text{sūsā kī, kāsū lā lāk} \\ \text{[lāk]} \\ \text{wīsīk, kū lā lāk lāk} \\ \text{wīsunūhwā kī,} \\ \text{[kunūhwā lā lāk lāk]} \end{array} \right.$

## PASSIVE VOICE.

## INDICATIVE MOOD.

## PRESENT TENSE.

(1.)		(2.)	
(Positive.) <i>I am seen.</i>		(Negative.) <i>I am not seen.</i>	
SING. 1.	Dūkwitlin	SING. 1.	Kīsin
2.	Dūkwitlis	2.	Kīsīs (or Kīz)
3.	Dūkwitli	3.	Kīsī
PLUR. 1.	Dūkwitlints	PLUR. 1.	Kīsints
			$\left. \begin{array}{l} \text{Kīsīs (or Kīz)} \\ \text{Kīsī} \end{array} \right\} \text{dūkwitla}$

## (2.)

(Negative.) *I am not seen.*

SING. 1.	Dūkwitl	mun
2.		ums
3.		mī, or um
PLUR. 1.		munts
2.		dākw ums
3.		dākw mī, or um

## PAST TENSES.

(1.)		(1.)	
(Positive.) <i>I was seen (to-day).</i>		(Negative.) <i>I was not seen (to-day).</i>	
SING. 1.	Dūkwitl	SING. 1.	Kīs $\left\{ \begin{array}{l} \text{din} \\ \text{dis} \\ \text{dī} \end{array} \right\} \text{dūkwitla}$
2.		2.	
3.		3.	
(2.)		(2.)	
<i>I was seen (a week or month ago).</i>		<i>I was not seen (a week or month ago).</i>	
SING. 1.	Dūkwitl	SING. 1.	Kīs $\left\{ \begin{array}{l} \text{idin} \\ \text{idis} \\ \text{idī} \end{array} \right\} \text{dūkwitla}$
2.		2.	
3.		3.	
(3.)		(3.)	
<i>I was seen (yesterday or long ago).</i>		<i>I was not seen (yesterday or long ago).</i>	
SING. 1.	Dūkwitl	PLUR.—1.	Dūkwitl $\left\{ \begin{array}{l} \text{wūtlints} \\ \text{dākw wūtl-ts} \\ \text{dākw wutli} \end{array} \right.$
2.		2.	
3.		3.	
	$\left\{ \begin{array}{l} \text{wūtlīn} \\ \text{wūtl-ts} \\ \text{wūtli} \end{array} \right.$		

## PAST TENSES. (Continued.)

(3.)

*I was not seen (yesterday or long ago).*

SING. 1.	} <b>Kis</b> {	wütlin	} dūkwitla	PLUR. 1.	} <b>Kis</b> {	wütlints	} dūkwitla
2.		wütlt-ts		2.		dākw wütlt-ts	
3.		wütlii		3.		dākw wütli	

(4.)

SING. 1.	} Dūkwitl {	zin klas in ump	<i>I am seen or have been seen by my father.</i>
2.		zau sis aus	<i>You are seen by your father.</i>
3.		zī sin ump	<i>He is seen by my father.</i>

(5.)

*I have been seen (already).*

SING. 1.	} La umk {	din	} dūkwitl
2.		dis	
3.		dī	

(6.)

*And then I was seen, or, I am now seen.*

SING. 1.	Lin	} dukwitl
2.	Las	
3.	Lī	
PLUR. 1.	Lā nūhw	}
2.	Lah dākw	
3.	" dākwī	

(7.)

*I am now seen.*

SING. 1.	La mun	} dukwāglitl (4)
2.	La ums	
3.	La um	
PLUR. 1.	La munūhw	} dukwāglitl (4)
2.	Lāh dākw { ums	
3.	" " { um	

## FUTURE TENSES.

(1.)

Positive.

*I shall be seen.*

SING. 1.	} klin	
2. Dukwitl		klis
3.		klī

(1.)

Negative.

*I shall not be seen.*

SING. 1.	} klin	} dūkwitl-kl	
2. <b>K</b> is			{ klis
3.			{ klī

(2.)

*I shall not be seen.*

SING 1.	$\left\{ \begin{array}{l} \text{klin} \\ \text{klis} \\ \text{klī} \end{array} \right\}$	dūkwāglitl-kl.
2. <b>Kīs</b>		
3.		

(3.)

*I shall be seen by Henry.*

SING. 1.	Dūkwił {	klin klas Henry
2.		klisīds Henry
3.		Klī Henry

Insert *um* before *klin*, &c., if the statement is denied.

## IMPERATIVE MOOD.

Positive Form.

SING.	} Dūkwitl {	la	<i>Be seen (thou).</i>
		la hyī	<i>Let him be seen.</i>
PLUR.		la hyints	<i>Let us be seen.</i>
	}	dākw lā	<i>Be seen (you plural).</i>
		dākw la hyī	<i>Let them be seen.</i>

Negative Form.

SING.	{ dūkwitlūkl <i>Be seen (thou).</i> hyī                } dūkwitla    { <i>Let him be seen.</i> hyints            }                { <i>Let us be seen.</i> { dūkwitl dākw <i>Be seen (you plural).</i>	
PLUR.		
	Kwāh dākw lā hyī dūkwitla,	<i>Let them be seen.</i>

*Dūkwila*: See.

## PASSIVE (Continued.)

## SUBJUNCTIVE MOOD.

(1.)

*That I may be seen.*

- SING. 1. Kun dūkwitlī  
 2. Kās dūkwitla ūs.  
 3. Kā dūkwitlīs.

(1.)

(Negative Form.)

- SING. 1. Kun **k**īsī dūkwitl.  
 2. Kās **k**īsa ūs dūkwitla.  
 3. Kā kīsīs dūkwitl.

(2.)

*That I may be seen (now for the first time).*

- SING. 1. Kun dūkwāglitlī.  
 2. Kās dūkwāglitla ūs.  
 3. Kā dūkwāglitlīs.  
 (No negative form).

(3.)

- |                |              |                   |                    |
|----------------|--------------|-------------------|--------------------|
| SING. 1. Kun   | } dūkwitl    | } <b>m</b> ī lāk  |                    |
| 2. Kās         |              |                   | } <b>m</b> ī lākūs |
| 3. Kā          |              |                   |                    |
| PLUR. 1. Kunts | } dūkwāglitl | } <b>m</b> ī lāks |                    |
|                |              |                   |                    |

(3.)

(Negative Form.)

- SING. 1. Kun kīsī lākun }  
 2. Kās kīsī lākūs } dūkwitl lāk  
 3. Kā kīsī lāks }

(4.)

*I cannot avoid being seen or I have already been seen.*

- SING. 1. Kun isī  
 2. Kās isa ūs  
 3. Kā isīs } dūkwitla  
 PLUR. 1. Kunts isī }

(5.)

*Lest I should be seen.*

- SING. 1. ā klin }  
 2. ā klas } dūkwitlāk  
 3. ā klī }  
 PLUR. 1. ā klints }

(6.)

(Negative.)

*Or I shall not be seen.*

- SING. 1. ā klin } **k**īs dūkwitlak  
 2. ā klas }

(7.)

*If I am seen.*

- SING. 1. Kunklū }  
 2. Kāsū } dūkwitl lak  
 3. Kū }

(Negative.)

*If I am not seen.*

- SING. 1. Kunklū } **k**īs lak dūkwitl lāk.  
 2. Kāsū }

(8.)

*If I had been seen.*

- SING. 1. Kunklu }  
 2. Kāsū } dūkwitl lākst  
 3. Kū }

Negative.

*If I had not been seen.*

Kunklū kīs lākst dūkwitl.

(9.)

*If I had been seen.*

- SING. 1. Gil um lāks { **d**in } dūkwitla  
 2. " " { **d**is } "

Negative.

*If I had not been seen.*

- SING. 1. Gil um lāks **d**in kīs dūkwitla  
 2. Gil um lāks **d**is kīs dūkwitla

## CONDITIONAL MOOD.

(1.)		(2.)	
<i>I may be seen.</i>		<i>I should have been seen.</i>	
SING. 1.	lāk-un	SING. 1.	Dūkwił um lāks- { din
2.	Dūkwił um { lāks	2.	" " " " { dis
3.	{ lākī		
Negative.		Negative.	
<i>I may not be seen.</i>		<i>I should not have been seen.</i>	
SING. 1.	Kīs lāk-un	SING. 1.	Kīs { lāksdin } dūkwiłla
2.	Kīs { lāks	2.	" { lāksdis } "
3.	" { lākī		

NOTES ON THE VERB *Dūkwiłla*.

## (1.) Examples of Conditional Mood Active:—

*I might not have seen her if you had not told me (where she was understood).*  
**Kīs** lāksdin dūkwiłlākī, kāsū **kīs** nīla giākun, &c.

Sometimes *lāksda* is again inserted after the second **kīs**.

(2.) The second of the two forms given of the Present Tense is used in answer to a question; it is also emphatic, and employed when a statement has been denied. The first form, *dūkwiłlin*, simply states a fact. The negative form is alike for both. There is also another form of the Present, *lamun dūkwił* or *lamun dūkwiłlīt*. If two persons who were hiding should be discovered, one would say, "I am seen," using the former verb; the other would reply, "I am also seen," using the latter. *Dūkwiłlila* refers to a more recent action than *dūkwiłla*.

(3.) Form (4) of the Past Tense, Indicative Passive would be used by a boy, if urged by a companion to do what he is not allowed to do, and means, "By-and-by I will do it, but I cannot do it while my father sees me."

(4.) The word *dūkwiłlīt* shows the action to be sudden, and that the subject did not wish to be seen.

## (5.) Examples of the Subjunctive Mood, Passive Voice:—

Lā lā hyin kun dūkwiłlī.

*Let me go that I may be seen.*

Kwās kwilāklatl giākun kun dūkwił mī lāk.

*Do not hide me, that I may be seen.*

Kwilātł idagia giākun kun kīsī lākun dūkwiłl lāk.

*Hide me, that I may not be seen.*

*Do not go yet or you will be seen.*

Reply—Kun isī dūkwiłla =

*How can I avoid being seen, or I have been seen already.*

**Kumsin** lā lāk ā klin dūkwiłlāk.

*I do not wish to go there lest I should be seen.*

Gil um lāks dis **kīs** dūkwiłla, **kīs** lāks dis wulā sa wa.

*If you had not been seen you would not have been imprisoned.*



## (2.)

## SECOND PERSON WITH IRREGULAR PASSIVE FORM.

Umyākulas	<i>You reverence or worship</i>	Kitlilā-klis	<i>You will fear</i>
Umyākulāk-dis	<i>You revered (to-day)</i>	Killum-klis	<i>You will be feared</i>
Umyākulāh-idis	<i>You revered</i>	Killums	<i>You are feared</i>
Umyākulāla	<i>Reverence (Imper.)</i>		
Umyākulā-klis	<i>You will reverence</i>	Wēkās	<i>You order or command</i>
Umyākulā-sū klis	<i>You will be revered</i>	Wēkāk-dis	<i>You ordered</i>
Umyākulā-sūs	<i>You are revered.</i>	Wēkāh-idis	<i>You ordered</i>
		Wēkāla	<i>Order</i>
Kitlilas	<i>You fear</i>	Wēkā-sūs	<i>You are ordered</i>
Kitlilāk-dis	<i>You feared (to-day)</i>	Wēkā-klis	<i>You will order</i>
Kitlilāh-idis	<i>You feared (a month ago)</i>	Wēkā-um lāks	<i>You may order</i>
Kitlilāla	<i>Fear (Imper.)</i>	Wēkā sū klis	<i>You will be ordered</i>

## (3.)

## THIRD PERSON SINGULAR WITH IRREGULAR PASSIVE FORM.

Kunyāsī	<i>He wonders at or is surprised</i>	Tlokwalā-sa-wūtlī	<i>He was exhorted (yesterday)</i>
Kunyāsāh-īdī	<i>He wondered (long ago)</i>	Tlokwalā-sū-hwidī	<i>He was " (long ago)</i>
Kunyāsāh-dī	<i>He was surprised (to-day)</i>	Tlokwalā-ināyī	<i>(Active Participle) Exhort-</i>
Kunyāsāla-hyī	<i>Let him wonder</i>		<i>ing</i>
		Tlokwalā-suwīnāyī	<i>(Passive Participle) Having</i>
			<i>been exhorted</i>
Kunyāzum-ī	<i>He is wondered at</i>		
Kunyāzum-ūtli	<i>He was " (yesterday)</i>		
Kunyāzumh-īdī	<i>" " (long ago)</i>		
Tlokwalī	<i>He speaks strong or exhorts</i>		
Tlokwalāh-īdī	<i>He spoke strong</i>		
Tlokwalāh-dī	<i>He spoke strong (to-day)</i>		
Tlokwalāla-hyī	<i>Let him speak strong</i>		
Flokwāla-sa- wī	<i>He is exhorted</i>		

	-ikulī	<i>He thinks</i>
	-ikulāk-dī	<i>He thought (to-day)</i>
	-ikulāh-īdī	<i>He thought (long ago)</i>
Gigia	-ikulā-hyī	<i>Let him think</i>
	-ikutlī	<i>He is thought</i>
	ikutl-wūtlī	<i>He was thought</i>
	-ikutl-īdī	<i>" "</i>

## (4.)

## EXAMPLES OF VERBS WITH IRREGULAR PASSIVE FORM.

Yālākun	<i>I send</i>	Tlāwīsin	<i>I am angry</i>
Wāk mun yālākāk	<i>Although I send (or sent) him</i>	Tlāwī-s-kli	<i>He will be angry</i>
Yālākāhīda-um	<i>He has sent (Nom. is present)</i>	Kā-is tlāwī-zināyī	<i>For his being angry</i>
" -mī	<i>" ( " not " )</i>		
Yālākum-un	<i>I am sent (Passive)</i>		
" -klin	<i>I shall be sent</i>		
A klin yālākum lāk	<i>Or I shall be sent</i>		
Kā un yālākīnāyī	<i>For my sending</i>		
Pudikilā-mas-in	<i>I make dark, I darken</i>	Gikumā-yin	<i>I am chief</i>
Wāk mun pudikilā-mas-uk	<i>Although I darkened it</i>	Gikumī-kli	<i>He will be chief</i>
Pudikilā-mas-īdā-mun	<i>I have darkened</i>	Kā-is gikumāyā-ināyī	<i>For his chieftaincy, or for his</i>
Pudikilā-mas-īda } um	<i>He has darkened</i>		<i>being chief (Pres. Part.)</i>
} mī			
Pudikilā-mad-tsa-wun	<i>I am darkened</i>		
" -tsū-klin	<i>I shall be darkened</i>		
A klin pudikilā mad-tsū lāk	<i>Or I shall be darkened</i>		
Kā un pudikilā-mazināyī	<i>For my dark'ing (Pres. Part.)</i>		

	-tsū-wun	<i>I am made angry</i>
	-tsū-um lāks	<i>You may be made angry</i>
Tlāwīsā-mad	-tsa-wūtlis	<i>You were made angry</i>
		<i>(yesterday)</i>
	-tsu-hwidis	<i>You were made angry</i>
		<i>(long ago)</i>

	-tsa-wun	<i>I am made chief</i>
	-tsū-klis	<i>You will be made chief</i>
	-tsū-um lāks	<i>You may be made chief</i>
Gikumāyā-mad	-tsū-wūtlis	<i>You were made chief</i>
	-tsū-hwidis	<i>" "</i>

EXAMPLES OF VERBS, ETC. (*Continued.*)

Pihwilin	<i>I feel</i>	Hūsin	<i>I count</i>
Pihwilā-klī	<i>He will feel</i>	Yīks hūsā-ī	<i>When he was counting</i>
Kā-is pihwilināyī	<i>For his feeling</i>	Yīks lā ī hūsā	
Piyūtlīn	<i>I am felt</i>	Yīks iā ī hūs-it	<i>When he had counted, or</i>
Piyūtl-mun	<i>I am liked i. e. he feels my</i>		<i>having counted</i>
	<i>kindness, therefore he is</i>	Kunklū hūsā-sū lāk	<i>If I be counted.</i>
	<i>grateful</i>	Hūsā-sū lāk un	<i>I may be counted</i>
	<i>You will be felt</i>	Ek kunts hūsā-sa-wī	<i>It is good or (right) to be</i>
	<i>You may be felt</i>		<i>counted.</i>
	<i>You were felt (yesterday)</i>		
	“ “ (long ago)		
Piyūtl {			
-klis			
-um lāks			
-wūtlts			
-īdis			

## (3.) VERBS CLASSIFIED BY MEANING.

## (1.) TRANSITIVE VERBS.

<i>I love him</i>	Tlāhwilā nūkwun klas	<i>I hate him</i>	Klīsilin klāk
<i>He loves him</i>	“ nūkwīs	<i>He hates him</i>	Klīsilik
<i>I eat it</i>	Hāmāpun klāk	<i>I listen to him</i>	Hūklilin klāk
<i>He eats it</i>	Hāmāpik	<i>He listens to him</i>	Hūklilik
<i>I see him</i>	Dūkwilin klāk	<i>I hire him</i>	Hilin klāk
<i>He sees him</i>	Dūkwilik	<i>He hires him</i>	Hilik
<i>I live with him</i>	Numā-itlin gla wī		
<i>He lives with him</i>	Numā-ītl gla wī		

## (2.) INTRANSITIVE VERBS.

<i>I speak</i>	Yākuntalin	<i>I slide</i>	Tlokunw
<i>He speaks</i>	Yākuntālī	<i>I am lying down</i>	Kwilātlin
<i>I am great</i>	Wālasin		
<i>I meditate</i>	Gigiaikulin	<i>I fell down</i> {	(out of doors) Kwihulsin
<i>I give up</i>	Yāhīdin		(in the house) Kwihālitlin
<i>I go out</i>	Lāwilsin		(on the beach) Kwihālisin
<i>I am sad</i>	Hwilsin		(in a canoe) Kwihātluksin

## (3.) VERBAL PROPOSITIONS.

(a) Dūhsau	<i>Jump through (e.g. a window)</i>	(c) Kwakiā-kā	<i>Fall from a height</i>
Dok-sau	<i>Look “</i>	Tikā-kā	<i>Drop “ “ “</i>
Gwuk-sau	<i>Pour “</i>	Dūhwā-kā	<i>Jump “ “ “</i>
Lāhsau	<i>Go “</i>	Lā-kā	<i>Go “ “ “</i>
Klupsau	<i>Climb “</i>		
Tik-sau	<i>Fall “ (e.g., roof of a</i>	(d) Dūhwūstau	<i>Jump up</i>
	<i>house)</i>	Lāgiūstau	<i>Go “</i>
Hunk-sau	<i>Look through (a glass)</i>	Ukūstau	<i>Put “</i>
		Zūkūstau	<i>Throw “</i>
(b) Dūhstā	<i>Jump into (water)</i>	Nupūstau	“ “ (only of a stone)
Kwuhstā	<i>Fall “</i>	Puklūstau	<i>Fly “</i>
Tik-stā	<i>Drop “</i>		
Lastā	<i>Bathe</i>	(e) Giak-ukau	<i>Comes out of or from</i>
Wudastā	<i>Cold Water</i>	Nikukau	<i>Pulled “ “ “ “</i>
Zilūkstā	<i>Hot Water</i>	Uka-mūkau	<i>Take from among</i>



(f) Uk-zūt	<i>Put it in (box)</i>	(h) Lestāla	<i>Walking round</i>
Gwuk-zūt	<i>Pour it in</i>	Zilhwsistāla	<i>Running " "</i>
Uk-wūtł-zūt	<i>Take it out</i>	Putłtsistāla	<i>Flying " "</i>
Kulhw-zūt	" " (as baby in cradle)	Sihwsistāla	<i>Paddling " "</i>
(g) Gīgil-kī	<i>walking among</i>	Kulksistāla	<i>Swimming " "</i>
Dūkwil-kī	<i>looking " "</i>		
Wunwakī	<i>hiding " "</i>		
Pihwil-kī	<i>feeling " "</i>		

## EXAMPLES.

La kulhw-zūdts lākā digiāzi	<i>They put it (the body) in the coffin</i>
Nik-wūtł-zūdā hyin	<i>Let me pull it out</i>
Giāk wūtł gīgilkī giākunts	<i>He came and dwelt among us</i>
Kīyos kwākwilākih dākws	<i>There is no salvation among you</i>
Sihwsistālah dunūhwā kā makiaula	<i>We have been round the island in a canoe</i>

(4) VERBS OF CONTACT (*klila*).

Giākū-klila	<i>Arrived (here); literally touched its destination</i>	Klapā-klila	<i>As a sail when spread on a log or fence to dry</i>
Lāgiaā-klila	<i>Arrived (there)</i>	Gīgīāā-klila	<i>On it</i>
Ukā-klila	<i>On it</i>	Hunālā-klila	<i>A clock or anything tall on a shelf</i>
Kūsā-klila	<i>Touched</i>		
Glapā-klila	<i>Nailed on to</i>		

(5) VERBS OF FEELING (*kula*).

Ekikula	<i>Happy, lit. a good heart</i>	Nākulkulin	<i>I have peace, lit. a quiet heart</i>
Ekī-kulin	<i>I am happy</i>	Ninkikulin	<i>I think, lit. a talking heart</i>
Ekī-kulā mad tsa wun	<i>I am made happy</i>	Yekikulin	<i>I am unhappy, lit. an evil heart</i>
Gīgīaikulin	<i>I think, lit. upon my heart</i>		

(6.) VERBS OF GRADATION (*nākwila*).

*Nākwila* adds the idea of incompleteness to the verb: the action is still going on.

Kī-	} <i>nākwila</i>	<i>Increase</i>	Hi-	} <i>nākwila</i>	<i>Continue his journey</i>
Kīyo-		<i>Decrease</i>	Aligia-		<i>Adding to it (e. g. brighter and brighter)</i>
Lā-		<i>Going to</i>	Zukwa-		<i>Getting shorter (e. g. the days are)</i>
Ke-		<i>Walking along</i>	Gilta-		<i>Getting longer</i>
Sīyū-		<i>Paddling " "</i>			

## (7.) VERBS OF LOCATION.

The verb to stand: if the person standing is in a house, he is *glāwūtł*; if he is standing out of doors, he is *glos*; if on the beach, *glāwīs*; if in a canoe, *glākwuksāla*, &c.

	IN DOORS.	OUT OF DOORS.	ON THE BEACH.	ON BOARD A VESSEL.
<i>Sit—</i>	Kwa-ītł	kwās	kwā-īs	kwāksāla
<i>Sleep—</i>	Mikītł	mīk-us	mīkīs	mīkuksāla
<i>Angry—</i>	Yākilītł	yākilīs	yākilīs	yāgiutluks
<i>Fight—</i>	Hekūgwītł	hekūgwīs	hekūgwīs	hekugwitluks
<i>Talking—</i>	Yākuntālagītł	yākuntālagīs	yākuntālagīs	yākuntālagiūtluks

VERBS OF LOCATION. (*Continued.*)

## (a) Anything Round, as an Apple:—

Magwītl	<i>On the floor</i>	Mukwilā-*klila	<i>On a shelf</i>
Mūhzau	<i>On a dish</i>	Mugwizaulitl	<i>On a table</i>

## (b) Things generally:—

Gia-itl	<i>In the house</i>	Gī-zau-litl	<i>On the table</i>
Gī-zau	<i>In vessels</i>		

## (c) Anything Long, as a Stick or a Gun:—

Gla-itl	<i>Standing</i>	} <i>in doors</i>	Kīa-kītl	<i>On the floor, e.g. a salmon</i>
Kia-titl	<i>Lying</i>		Kīaka-zaulitl	<i>On the table</i>
Tī-gwītl	<i>Hanging up</i>		Kīak-zau	<i>In a vessel or basket</i>
Kiata-zaulitl	<i>On a table</i>		Tīg-wītl	} <i>Hanging up</i> { <i>in doors</i> <i>on the beach</i> <i>out of doors</i>
			Tīg-wīs	
			Tīk-wīs	

## EXAMPLES.

<i>Where is my apple?</i>	Wīdin apple a?	<i>On the table (out of doors)</i>	Hunzaulasī
<i>On the table (in doors)</i>	Magwa-zaulitl	<i>Where is my gun?</i>	Wīdin hunglum a?
“ <i>(out of doors)</i>	Magwa-zaulasī	} <i>It is on the table or plat-</i> <i>form</i>	Kiadazaulitl
<i>Where is my box?</i>	Wīdin gildas a?		
} <i>On the table (in doors) or</i> <i>platform</i>	Hunzaulitl	<i>It is on the floor</i>	Kiaditlī
		<i>It is on the shelf</i>	Kiatālāklilī

## (8.) VERB TO FALL.

Tāh-id	<i>(Tree) falls</i>	Tā-gialis	<i>Falls on the beach</i>
Tāh-id-kl	<i>It will fall</i>	Tā-gia-uls	“ <i>on the ground</i>
Tāh-ida lāk	<i>It may fall</i>	Tā-kīn-kl	<i>It will fall on the log</i>
Tāh-ida lākst	<i>It might have fallen</i>	Tā-kīn lāk	<i>It may “ “ “ “</i>
Tā-skum	<i>(Tree) falls on a house, &amp;c.</i>	} <i>Tā-skum-kl, or</i> <i>Tāgiaā-klilā-kl</i>	<i>It will fall on the house</i>
Tā-kīn	<i>Falls on a log</i>		

(See VERBS OF CONTACT.)

## (9.) POSSESSIVE VERBS.

Giūkw	<i>House</i>	Tlāwunum	<i>Husband</i>
Giūgwādamun	<i>I have a house</i>	Tlāwādāmum	<i>I have a husband</i>
Ump	<i>Father</i>	Dālā	<i>Money</i>
Auyādamun	<i>I have a father</i>	Dālā nūkw mun	<i>I have money</i>

*Question:—Tibāyū nūkw mas?**Have you boots? (i.e. if you have not I will give you some.)**Answer:—Tibāyū nūkw mun**I have boots**Question:—Uknūgwādamas tibāyu?**Have you boots?**Answer:—Uknūgwādamun kluk.**I have them*

NOTE.—*Uknūgwādamun* is always an answer; if you simply state a fact, e.g., “I have boots,” say *tibādin*

Giūgwādamas?	<i>Have you a house?</i>
Kwungwādamas?	<i>Have you a child?</i>
Kugiādamas?	<i>Have you a wife?</i>
Kugiādamun	<i>I have a wife.</i>

\* The moon is called *mukwīla*.

## (10.) ENDEAVOURING VERBS.

These verbs may be recognised by the reduplication of the first syllable of the root: their subject is generally endeavouring to perform the action expressed and nearly always implying ability to do it.

Lā-lumhwā	} Endeavouring to	{	dry
Tā-tulkwā			soften
Mā-mikā			sleep
Kiā-kiilwā			buy
Dā-dükwā			look for

<i>Examples:—</i> Tā-tulkwun klāk	<i>I wish to have it soft</i>
Lī tā-tiza	<i>He has gone to get stones</i>
Lī dādükwā kīs kwilī	<i>He has gone to look for his uncle</i>
Pā-patā munūhw Adū	<i>We have come for medicine, sir</i>

NOTE.—Some of these reduplicating verbs can scarcely be called endeavouring, e. g., *Kātā lā hyūk*, let it be full. *Kā-kātātla la hyūk*, put a little more in (than you generally do).

(11.) PRETENDING VERBS (*būtla*).

Tlāhwila	} bütla	} Pretending to	{	love
Mikā				sleep
Tlil				die
Māmātla				be a white man
Iākula				to work
Tlāhwila nūkw butlints				<i>We are pretending to love</i>
Bākwūm bütlints				<i>We are imitating Indians</i>
Tlāhwila bütlints				<i>We are falsely loved</i>

(12.) CAUSING VERBS (*mas*).

Datlila masin klāk	<i>I made him laugh</i>	Kinā-i sa maza wun	<i>I am made cold</i>
Tlilā masin	<i>I make to die, I kill</i>	Umistā mat tsū klin	<i>I shall be made free</i>

(13.) CAUSING VERBS in (*īla*).

Giūkw	house	Giūkwilā	making a house
Dihiyilā	road	Dihiyilā	making a road
1. Giūkwilā klin		<i>I will build a house</i>	
2. " klis		<i>You will build a house</i>	
3. " klī		<i>He will build a house</i>	
1. Giūkwilūtlin		<i>I built a house (long ago).</i>	
3. Giūkwilūtli		<i>He built a house (long ago).</i>	

## (14.) VERBS EXPRESSING DOUBT (by means of Adverbs).

Wēla-ānawīs	} perhaps or suppose
Gīanum	
Kunt	
Kuntū	Object near
Kuntī	Object further off.

## EXAMPLES.

Wēla-ānawīsī, isin kauklila, *perhaps he is, I do not know*  
 Giāk um kuntū kwāsūttila, *perhaps they are coming (in a canoe)*  
 Nīk kunt īks (or yīks) nīkia ī, *I suppose he means that (subject understood) by speaking in this manner*  
 La um kuntī, *perhaps they are gone*  
 La giānumks, tā klin, *perhaps I will go (in reply to the question, "Will you go?")*  
 Ke gianumks tā klints or ke gianum glā klints, *perhaps we will*  
 Is gianum kla wisin lā-kl, *I suppose I shall go ("all the others are going" understood)*

## (15.) COMMUNICATIVE VERBS (pa).

Giawāla-pa	help	} each other
Muhyā-pa	strike	
Tlāhwila-pa	love	
Klisila-pa	hate	
Hunkla-pa	shoot	

Examples:—Giawāla pā lā hyints, *let us help each other*  
 " pā lākunts, *we may help each other*  
 " pā lāks-dints, *we might have helped each other*  
 " pūtlints, *we used to help each other.*

## (16.) DESIRING VERBS (īks.)

Nāk-īks-din	<i>I desire drink</i>	Mīk-īks-din	<i>I desire sleep</i>
Nākiksdutlin	<i>I wanted drink</i>	Iākula-īks-din	<i>I desire to work</i>
Nākiksda lāk un	<i>I may want drink</i>	Dūkwila-īks-din	<i>I desire to see</i>
Nākiksda lāks din	<i>I might have wanted drink</i>		

Most of these verbs have their noun formed from the root of the verb and *bis* affixed.

Nāk-bis	<i>Drunkard, fond of drink</i>
Aus-bis	<i>Fond of his father</i>
Mīk-bis	<i>Always sleeping</i>
Dadātl-bis	<i>Always laughing</i>

These nouns with the verb to be affixed are conjugated thus:—

Nākbisin	<i>I am a drunkard</i>
Nākbis-ūtlin	<i>I was a drunkard</i>

## (17) ADJECTIVE VERBS (āk).

Wūdālūk	It is {	cold	Klākwūk	<i>It is red</i>
Zilkwūk		warm	Yūgwūk	<i>It rains</i>
Wunkulūk		deep	Kwīsūk	<i>It snows</i>
Līkūk		wide		

*Kula* added to a noun is a verb, meaning to "say" or "call."

Nazarene kula sū klī	<i>He shall be called a Nazarene</i>	Dun-kula	<i>Singing.</i>
Gīkumī kula sū klī	<i>He shall be called chief</i>		

N.B.—Whenever the Indians sing, they beat a large wooden box (drum), and it says *dun, dun, dun*; hence *dunkula*.

## V.—PREPOSITION.

A preposition is a word placed before a noun or pronoun to show the relation between it and some other word in the sentence.

Lāk	<i>To, unto, in, on, from, at, according to</i>	Bunāya, bunī, bunaābauya	<i>Under</i>
Lākā	<i>To the, at the, in the, on the</i>	Gialī	<i>Before</i>
As	<i>Of</i>	Nahwatla	<i>Near to</i>
Glū, yis	<i>With</i>	Ulk-gli	<i>Behind</i>
Kā	<i>For</i>	Gitl	<i>On account of</i>
Nahwātla	<i>Near</i>	Hihyami	<i>Except</i>
Sunbunt	<i>Throughout</i>	Mūkstaunī	<i>Instead of</i>
Kī	<i>Among (always affixed to verbs, as "gīgilkī" = walking among)</i>	Nākūd	<i>Between</i>

## EXAMPLES.

Lāk. La nīk lāk dāk-wik	<i>He said to them</i>
Hāgia lākā giūkw	<i>Go to the house</i>
Lāk kwīxdum as bagwānum	<i>According to man's nature</i>
Lāk wātldum as George	<i>Agreeing with George's words</i>
Hāgia glū Henry	<i>Go with Henry</i>
-Yis giada dāla	<i>(Buy bread) with this money</i>
Yiglikwis āyasū yisa dunum	<i>His hands were bound with rope</i>
Pihwilin klasin (or more fully klāk yisin) siwāyū	<i>I feel it with my paddle</i>
Gehīdī lāk Victoria	<i>Came from Victoria</i>
Giāyūtl lāk Victoria	<i>From or belonging to Victoria</i>
Kā un Umpa	<i>For my father</i>
Nahwātluḱl	<i>Near you</i>
Lin sunbunt kwā nāla	<i>I have (worked) through this day</i>
Ukābūdākw	<i>Put it underneath</i>
Bunaābauya sa humhdumītl	<i>Under the table</i>
Sū uma giālagiwis	<i>You go before him</i>
Sū uma ulkglis	<i>You go behind him</i>
Hihyami Jane kīs lā	<i>They all went except Jane</i>
Sū mun giāk-itl	<i>I came on your account or for you</i>
Sū um iākulā gitl-ts	<i>He is working for you (on your account)</i>
Kunts mūkstaunya	<i>Instead of us</i>
Kwālā nākūd giākunūhw	<i>Do not come between us</i>

## VI.—ADVERB.

An adverb is a word added to a verb or adjective to modify its meaning. For instance in *ūpātlā nīkia*, "secretly saying," the adverb *ūpātlā*, "secretly," modifies the verb "to say" *nīk*. In *aul ek*, "very good," the adverb, *aul*, modifies the adjective, *ek*. Adverbs may be divided into many classes according to their signification. I will now try to divide them and give examples of each adverb.

## (1.) INTERROGATIVE ADVERBS.

Mās	<i>How? What?</i>	Māsīs hī gītla ūs kwikiālī?	<i>Why do you speak so, or, what is the reason of your speaking thus?</i>
Māsas? or māsīs ukīksda sa wā ūs?	<i>What do you want?</i>		
Māsī giāda?	<i>What is this?</i>	Māsīs īsītla ūs giāk gla wunūhw?	<i>Why do you not come with us?</i>
Māzaus?	<i>What are you doing or what do you want? (an impatient question)</i>	Mās klin? } Wī gī lā klin? }	<i>What shall I do? (an Indian would say this if you called him)</i>
Māsūs dāakwākūs?	<i>What is in your hand or what are you carrying?</i>	Wihīd klin klak?	<i>How shall I do it?</i>
Ek mas?	<i>Are you well?</i>	Wilākw klin lā-kl?	<i>When shall I go? or I will not go or I am not going</i>
Wetlas?	<i>How are you? (only of persons who are ill)</i>	Wilākw tā klin lā-kl?	<i>But when shall I go?</i>
Wetli?	<i>How is he?</i>	Gins punas Zāmāsīla?	<i>How often have you been to Victoria?</i>
Aēkiīksāla mas?	<i>How are you?</i>		
Wihsī?	<i>What is it like?</i>		

## (2.) ADVERBS OF MANNER.

Aekiāla	<i>Do it nicely</i>	Himunātla-um	<i>Always</i>
Yāyākiākilāla	<i>Do it carelessly</i>	Himunātla-um zihka	<i>He is always ill</i>
Aūyāla	<i>Slowly (only used if walking)</i>	Ulāk	<i>Almost</i>
Halsila	<i>Scarcely</i>	Ulākun kwihuls	<i>I almost fell down</i>
Halsila mum kwilā	<i>I am scarcely alive</i>	Yaula, inūhw	<i>Ever</i>
Aul	<i>Very, truly, exceedingly</i>	Hinūma	<i>Purposely</i>
Aulin ekikula	<i>I am very happy</i>	Hinūma huntliduk	<i>He shot it purposely</i>
Aulin nīk yūkl	<i>Verily, I say unto you</i>	Nātlnumpuna	<i>Sometimes</i>
Hehīda-um	<i>Suddenly</i>	Mātlnumpunī gin lā lāk	<i>I sometimes go there</i>
Hehīda-um Kīyowit	<i>It suddenly disappeared</i>	Kwātłkwunāla	<i>Often</i>
		Kwātłkwunālī gin lā lāk	<i>I often go there</i>
In answer to the question "What do you require?"			
Aumun or au kālā mun or au mun giāk	<i>I want nothing or I only came</i>	Lēgī-nākwila	<i>Following one after the other</i>
Klāklāyū-nākwila	<i>Alternately, one after the other</i>	Lā klin ūgwākā	<i>I will also go after the other</i>

## (3.) NEGATIVE ADVERBS.

Kī No, not Kīyos	<i>Not any, nothing</i>	Kīsin lā inūhw lāk	<i>I never go there (always used with a negative)</i>
Kīsin wīwūsīlākā	<i>I am not poor</i>		
Kīsin zihkā-inūkwā	<i>I am never ill</i>	Wūtł-um	<i>For nothing, vain</i>
Kīyosin dāla	<i>I have no money</i>	Wutł-mi gints lā lāk	<i>We gained nothing by going</i>
Kīyosin kwih-ida as lāwils	<i>I cannot go out</i>	Wūtł-um wātldum	<i>Foolish talk</i>
Kīyos bagwānum la um } dūk wā klilū yaulāk God }	<i>No man has ever seen God</i>	Wūtł mun giāk	<i>I came in vain or I had no purpose in coming</i>

The negative is sometimes expressed by *hī* and *wī*. The former always precedes the word it modifies and the latter always follows it. Correctly speaking, *ī* is the negative and the consonants are prefixed when euphonic. Sometimes they are not used; *īsin kauklīla*, or, *kīsin kauklīla*, "I do not know," are equally correct.

## (4.) ADVERBS OF PLACE.

Kilas lāk gia	<i>Come here</i>	Ekī da	<i>It is good there</i>
Kīnum lāk gia	<i>There are plenty here</i>	Kīnum lākī da	<i>There are plenty there</i>
Hās lākī da	<i>Go there</i>		

## (5.) TEMPORAL ADVERBS.

Um as, ma wīs gla	<i>First, for the present</i>	Lā kī da giālā-bā yūtlā	<i>In the beginning</i>
Lukw klin da um as	<i>Make up the fire before you do anything else</i>	Lāgimūhw, kwātlila	<i>Already</i>
Kila um as	<i>Come here before you go any farther</i>	Lāgimūhw ma ik kwāpīda	<i>Is it torn already?</i>
Hī um as glūk kwetli	<i>Let it be like that for the present</i>	Kwātlila mī gin nik yūkl	<i>I have told you already or before</i>
Ek ma wīs glūk	<i>It will do for the present</i>	Kī-ūtl-wūtl	<i>Long time ago</i>
Wigia hyints kwātl ma wīs gla	<i>Let us leave off for the present</i>	Kī-ūtl-wūtlīn lā lāk Yalīs	<i>A long time ago I went to Alert Bay</i>
Kwātlagia um asī	<i>Let him stop for the present (person referred to not near).</i>	Atl-um	<i>Finally, just now, by and by</i>
“ “ as glūk	<i>Let him stop for the present (person referred to near)</i>	Atl-um klin lā-kl	<i>I will go presently</i>
Is ma ūtla	<i>Before</i>	Himūn ātlī kwātlā	<i>I have just finished</i>
Yāksūm ūtli da bākwūm, is ma ūtlā kūs giākā	<i>The Indians were wicked before you came</i>	Wāwāsdum	<i>During, while, till, until</i>
num puna	<i>Once (see MULTIPLICATIVE ADJECTIVES)</i>	Ekikulin klākun wāwāsdum	<i>I was happy during my stay</i>
		lāk England	<i>in England</i>
		Kupetla klin glūs kun wāwāsdum kwilā	<i>I will stay with you till I die (lit. as long as I live)</i>
		k gin	<i>As or when I</i>
		ks la ā kūs	<i>As or when you</i>
		ks lā ī	<i>As or when he</i>

## EXAMPLES.

Dātlidin klāks la ā kūs dunkit  
 Wa yiks la ī bunūtlila  
 Yiks la ā kūs yālāk-īdun, lin ūgwākā  
 yālākā sig  
**K**is ma ī  
 Kā iks **k**is ma ī John la ī glum lākū  
 wālazi  
**K**is dek mā ik kwātlā  
 Kī-ūtl  
 Kī-ūtl kle kūs giākā  
 Atl-īt  
 La ums, ātl-īda  
 Sta ākw,  
 Bagwānum sta ākw  
 Ek sta ākw  
 Nānī sta ākw

*I laughed when you sang*  
*Now when he was going down*  
*As you have sent me, so have I also sent them*  
*Not yet (dek is inserted to express surprise and sometimes anger)*  
*For John was not yet cast into prison*  
*Why, you have not yet finished!*  
*Soon*  
*You have soon come*  
*Late*  
*You are late*  
*In like manner*  
*It has the appearance of a man*  
*It looks as if it were good*  
*It is like a goat*

## VII.—CONJUNCTION.

A conjunction is a part of speech employed to connect words and sentences. It is usual to divide conjunctions into two classes, Copulative and Disjunctive. The former connect or continue a sentence; the latter serve to express opposition to the principal sentence.

## (1.) COPULATIVE CONJUNCTIONS.

Glū, himīs	<i>And</i>	Himīs	<i>This word connects numbers</i>
Yin gla wī da Umpa numūkw munūhw	<i>I and the Father are one</i>	Mātl tsum giūstau himīsā num	<i>Twenty and one</i>
Glūs	<i>And you</i>	Kās	<i>That</i>
George gla wīs abump	<i>George and his mother</i>		

COPULATIVE CONJUNCTIONS. (*Continued.*)

Wa la mun kwätlil nīk yūkl, kās ūkwisi klūs	<i>And now I have told you before it comes to pass that ye might believe</i>	Kuntsū or kunūhwū La um lāk un, kāsū nīk lak	<i>If we, when we I would go, if you wished me to</i>
La mī Giūhwidā kun ūmpa la mi sin hatlākā klūkl	<i>And then Help my father and then I will pay you</i>	La um lāk un, kunklū nīk lāk Kās ūkwisi klūs, kū lā-kl hī kwih-id klī	<i>I would go, if I wanted to That, when it comes to pass, ye may believe</i>
Gil Gilh dākw mī lāks de kūs tlāhwila nū kwun	<i>If, when If ye loved me</i>	Kā Kāk gin Kāks Kā iks	<i>Because Because I Because you Because he</i>
Gil ma ī da bagwānum <b>Kis</b> kupetla gla wun	<i>If a man abide not with me</i>	Lāgītlin tlāhwilānūkws kāks tlāhwilānūkwa ā kūs in	<i>I love you, because you love me (lit. The reason I love you is because you love me)</i>
Wa gilh dākw um-kl wīsis dūkwila kluk	<i>When ye (plu.) shall see this</i>	Lāgītlin tlāhwila nūkws kā iks tlāhwila nūkwa un	<i>I love him, because he loves me</i>
Gil um-kl wīsis kwätl-kl, giāklilā giakun	<i>When you have finished, come to me</i>	<b>Kis</b> ī lā, kā iks zilgwāluma ā sis ūmp	<i>He did not go, because for- bidden by his father</i>
Kunklū Kāsū Kū	<i>If I, when I If you, when you If he, when he</i>		

## (2.) DISJUNCTIVE CONJUNCTIONS.

Lā tā, lā tī, lā glātī.	<i>But</i>	Hānāk wilāla ā klin yākilīt-	<i>Come back quickly, or I shall</i>
Lā tin kunklil yāksum	<i>But I am very wicked</i>	lūs	<i>be angry with you</i>
Yāksāmun lā glā tas okia	<i>I am sinful, but you are good</i>	Wāh	<i>Although. (Occurs fre- quently in this lan- guage)</i>
<b>Kis</b> gla tī da lāmādū hūklī- lāh	<i>But the sheep did not hear them</i>	Wāh mun wūklāk	<i>Although I asked him</i>
A klin	<i>Or I shall</i>		
A klas	<i>Or you will</i>		
A klī	<i>Or he will</i>		

The other part of the sentence is not generally uttered, being understood, e.g. *Kwākwālī wāhya, Kis glā tin ayūsilāk*; Although he is speaking (my language) I do not understand it. *Giak mun dūkwūkl wāhums Kis giak dūkwīnūhw giūkun*; I have come to see you, although you never call upon me.

<b>Kis</b> .... <b>Kis</b> um ka ā	<i>Neither, nor</i>
<b>Kis</b> in nānākmīk, <b>Kis</b> um ka ā wīsin hūklilāk	<i>I neither answered him, nor did I listen to him</i>
Hīhya um, hīgia um	<i>Only, except</i>
Hīgia um { kunklū	<i>Except I</i>
{ kāsū	<i>Except you</i>
{ kū	<i>Except he</i>
<b>Ki</b> yosī kwih ida as lāwilsa, hīgia um kū kautlākīlā lā <b>Kis</b> <b>Kā</b> kūklāsū	<i>He cannot go out, except he learns his lesson</i>
Hīhya um-kl kāsū lā lāk klāyū lāk <b>Kis</b> tā klis la-īkl lākā ike awināgwīs	<i>Except you repent, you will not go to the heavenly place</i>

Observe the words *lā lāk* in the last sentence. *Lā* is the verb to go, and the idiom is "except you go and repent." The verb is of frequent occurrence in sentences that do not seem to require it.

Itit	<i>again</i>	Itidagia	<i>do it again</i>
Kāt	<i>also, or</i>	Lā kāt nīkia	<i>and he also said</i>
Lā kā ī itit nīk	<i>and he said again</i>		



## VIII.—INTERJECTION.

An Interjection is a word used to express an emotion or a feeling of the person speaking.

ānānā!  
āzīkias!

*When hurt*  
*Surprise at the great quan-*  
*tity*

Hawī!

*Whenever water is disagree-*  
*ably cold*

ā!  
Klā-wū!  
ā kias awā!

*O!*  
*How beautiful*  
*Splendid*

Kīnum-zīkias!  
Kwunk-zīkias!  
Yūgwā-zīkias!

*Oh! how many*  
*Oh! how wet*  
*Oh! what a rain Oh!*  
*such a rain*

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ROYAL SOCIETY OF CANADA.

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TRANSACTIONS

SECTION III.

MATHEMATICAL, PHYSICAL AND CHEMICAL SCIENCES.

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PAPERS FOR 1888.



I.—*A Table of the Cubical Expansions of Solids.*

By Prof. J. G. MACGREGOR, D.Sc.

(Read May 23, 1888.)

It has been found by experiment that in general the volume of any body at temperature  $t^\circ$  may be expressed in terms of its volume at any other temperature  $\tau^\circ$ , and of the difference of temperatures, by means of the expression,

$$V_t = V_\tau (1 + A(t - \tau) + B(t - \tau)^2), \quad (1)$$

where  $V_t$  and  $V_\tau$  are the volumes at  $t^\circ$  and  $\tau^\circ$  respectively and  $A$  and  $B$  are constants for the substance of which the body consists. In some cases an additional term  $C(t - \tau)^3$  is necessary. But in general the value of  $C$  is so small that it may be neglected.

As the constants  $A$ ,  $B$ ,  $C$  have different values for different values of  $\tau$ , it is convenient to choose some one temperature as a temperature of reference, and for this purpose the temperature  $0^\circ\text{C}$  is now universally chosen, the above expression becoming therefore,

$$V_t = V_o (1 + at + bt^2). \quad (2)$$

The constants  $a$  and  $b$  (and  $c$  also, the coefficient of  $t^3$ , in cases in which a term in  $t^3$  is found necessary) having been determined for any substance, the volume of any body of that substance, whose volume at  $0^\circ\text{C}$  is known, may be determined at any other temperature within the temperature limits of the experiments by which the values of  $a$ ,  $b$  and  $c$  were found.

Density may be substituted for volume in the above formula, provided the signs of  $a$  and  $b$  be changed. For if  $\rho_t$  and  $\rho_o$  are the densities of a substance at  $t^\circ$  and  $0^\circ$  respectively, we have, in general,

$$\rho_t / \rho_o = V_o / V_t = 1 / (1 + at + bt^2) = 1 - at - bt^2,$$

since  $a$  and  $b$  are, in general, small quantities.

In the case of isotropic solids, length may be substituted for volume in the above formula, provided the constants  $a$  and  $b$  be divided by 3, change of length in any direction in such cases being numerically equal to one third of the corresponding change of volume. The formula in the case of the linear expansion of such solids becomes therefore:—

$$L_t = L_o (1 + \frac{a}{3}t + \frac{b}{3}t^2). \quad (3)$$

In the case of æolotropic solids, the linear expansion is different for different directions, and must therefore be specially determined.

To determine the volume at  $t''$  when that at  $t'$  is given, we have:—

$$\begin{aligned} V_t &= V_o (1 + at + bt^2), \\ \text{and} \quad V_{t'} &= V_o (1 + at' + bt'^2). \\ \text{Hence} \quad V_{t'} &= V_t \frac{1 + at' + bt'^2}{1 + at + bt^2}, \\ &= V_t (1 + a(t' - t) + b(t'^2 - t^2)), \end{aligned} \quad (4)$$

since  $a$  and  $b$  are small quantities.

The mean coefficient of thermal expansion between two temperatures is by some writers defined as the change of volume per degree and per unit volume at the lower temperature, and by others as the change of volume per degree and per unit volume at the temperature of reference ( $0^\circ\text{C}$ ). In terms of the symbols used above, it is in the former case the value of  $\frac{V_{t'} - V_t}{V_t(t' - t)}$ , and in the latter case the value of  $\frac{V_{t'} - V_t}{V_o(t' - t)}$ . From (4) it follows at once that:—

$$\frac{V_{t'} - V_t}{V_t(t' - t)} = a + b(t' + t) \quad (5)$$

provided  $a$  and  $b$  are so small that their powers and product may be neglected. From (2) and a similar equation with  $t'$  substituted for  $t$ , it follows that:—

$$V_{t'} - V_t = V_o (a(t' - t) + b(t'^2 - t^2))$$

exactly, and therefore that

$$\frac{V_{t'} - V_t}{V_o(t' - t)} = a + b(t' + t), \quad (6)$$

whatever the magnitudes of  $a$  and  $b$  may be. Provided  $a$  and  $b$  are sufficiently small, therefore, the mean coefficient has the same value between given temperature limits according to both modes of definition; and if  $a$  and  $b$  are known, this value may be determined for any temperature range.

The “true” coefficient of thermal expansion at any temperature is the rate at which volume varies with temperature at that temperature per unit volume at zero. It is thus  $\frac{1}{V_o} \cdot \frac{dV_t}{dt}$ , and by differentiation of (2) is seen to have the value  $a + 2bt$ . The true coefficient at a given temperature is clearly the mean coefficient (per unit volume at  $0^\circ\text{C}$ ) between two temperatures indefinitely near one another and including the given temperature; and the above value is also obtained from (6) by noting that ultimately  $t' + t = 2t$ .

Sometimes, but rarely, the true coefficient at any temperature is defined as the rate at which volume varies with temperature at that temperature per unit volume at that temperature—in symbols,  $\frac{1}{V_t} \cdot \frac{dV_t}{dt}$ ; and by (5), its approximate value, provided  $a$  and  $b$  be small, is  $a + 2bt$ , the same as the value of the true coefficient according to the former definition.

The following table contains the values of  $a$  and  $b$  (and of  $c$  also in cases in which  $c$  is found to have an appreciable value) in the case of the more important and interesting solids. A table containing an exhaustive list of the determinations of these constants would be so long that in most cases I have thought it well to give only the most recent and most accurate determinations, though in some important cases, as in that of glass, a

large number of such determinations have been given. Many observers of thermal expansion have determined, not the values of the constants  $a$  and  $b$ , but the values of the mean coefficient throughout given ranges of temperature. In many cases, especially in cases in which the values of  $a$  and  $b$  are not known, these results have been given. They are contained in the fourth column, and in the fifth column are stated the temperature ranges to which they apply. In general, also, these temperatures are the ranges throughout which observations were made. A more complete list of the older determinations of mean coefficients of expansion will be found in Part III of the "Constants of Nature," by Prof. F. W. Clarke, published in Vol. XIV of the Smithsonian Miscellaneous Collections, but Prof. Clarke's tables do not give the values of the constants  $a$  and  $b$ .

SUBSTANCE.	$a \times 10^8$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^8$	Temperature Range. ( $^{\circ}\text{C}$ .)	OBSERVER.
Aluminium (cast). . . . .	6664	3435	.....	7008	0—100	Fizeau
Do. (commercial). . . . .	.....	.....	.....	6660	0—100	Calvert, Johnson & Lowe
Do. . . . .	.....	.....	.....	7439.4	0—100	L. Pfaff
Do. . . . .	.....	.....	.....	7062	0—100	Glatzel
Alums (in powder)— Ammonium-Aluminium Alum. . . . .	.....	.....	.....	2840	0—20	Spring
	.....	.....	.....	2585	0—60	"
	.....	.....	.....	5343	0—100	"
Potassium-Aluminium Alum. . . . .	.....	.....	.....	2635	0—20	"
	.....	.....	.....	4198	0—60	"
	.....	.....	.....	31118	0—90	"
Rubidium-Aluminium Alum. . . . .	.....	.....	.....	2070	0—20	"
	.....	.....	.....	2635	0—60	"
	.....	.....	.....	5045	0—100	"
Cæsium-Aluminium Alum. . . . .	.....	.....	.....	2610	0—20	"
	.....	.....	.....	2621	0—60	"
	.....	.....	.....	7699	0—100	"
Potassium-Chromium Alum. . . . .	.....	.....	.....	2330	0—20	"
	.....	.....	.....	4968	0—60	"
	.....	.....	.....	59503	0—80	"
Ammonium Sulphate. . . . .	.....	.....	.....	8335	0—20	"
	.....	.....	.....	9051	0—60	"
	.....	.....	.....	11191	0—100	"
Antimony . . . . .	2770	3970	.....	3167	0—100	Matthiessen
Do. (pure). . . . .	.....	.....	.....	2940	0—100	Calvert, Johnson & Lowe
Do. (crystal). . . . .	3387	870	.....	3379	0—100	Fizeau

SUBSTANCE.	$a \times 10^8$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^8$	Temperature Range. ( $^{\circ}\text{C}.$ )	OBSERVER.
Aragonite.....	.....	.....	.....	6195	39.5—40.5	Fizeau
Arsenic (sublimed).....	1158.6	6480	.....	1806	0—100	"
Augite .....	2305	1800	.....	2485	0—100	"
Beryl.....	.....	.....	.....	105	0—100	F. Pfaff
Bismuth.....	3502	4460	.....	3948	0—100	Matthiessen
Do. ....	.....	.....	.....	3990	0—100	Calvert, Johnson & Lowe
Do. (crystal).....	3706	4155	.....	4121	0—100	Fizeau
Brass (71 % by mass, 66.15 % by volume, of Cu.).	5161	5580	.....	5719	0—100	Matthiessen
Do. (71.5 % of Cu, 27.7 of Zn, 0.3 of Sn, 0.5 of Pb).....	5341	2940	.....	5637	0—100	Fizeau
Bromide of Silver { (HgBr). ....	.....	.....	.....	10100	—60— 0	Rodwell
	.....	.....	.....	10429	0—100	"
	.....	.....	.....	11033	0—400	"
Bronze (86.3 % of Cu, 9.7 of Sn, 4 of Zn.) ....	5101	3060	.....	5406	0—100	Fizeau
Do. (25 % of Sn.) ....	.....	.....	.....	5532	16.6—100	Daniell
Cadmium.....	8078	14000	.....	9478	0—100	Matthiessen
Do. ....	.....	.....	.....	9363	0—100	Glatzel
Do. (compressed powder).....	8816	4890	.....	9306	0—100	Fizeau
Calc spar.....	.....	.....	.....	1541	39.5—40.5	"
Do. ....	.....	.....	.....	2010	0—100	F. Pfaff
Caoutchouc (commercial grey).....	.....	.....	.....	67000	0— 30	Russner
Do. (vulcanized, unstretched) .....	.....	.....	.....	95784	14— 37	Lebedeff
Do. do. do.....	.....	.....	.....	67646	11—295	"
Do. (do., stretched) ..	.....	.....	.....	56158	14.5—37.5	"
Do. do. do. ..	.....	.....	.....	66906	12.5— 30	"
Carbon (graphite).....	.....	.....	.....	877	16.6—100	Daniell
Do. do. ....	.....	.....	.....	632	16.6—350	"
Do. do. ....	2237	1515	.....	2388	0—100	Fizeau
Do. (gas-coke) .....	1488	1650	.....	1653	0—100	"
Do. (diamond).....	181.2	2160	.....	396	0—100	"
Cassiterite .....	925.6	1355	.....	1061	0—100	"



SUBSTANCE.	$a \times 10^8$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^8$	Temperature Range. ( $^{\circ}\text{C}$ .)	OBSERVER.
Chloride of Silver (AgCl).....	.....	.....	.....	9245	—60— 0	Rodwell
.....	.....	.....	.....	9492	0—100	"
.....	.....	.....	.....	9865	0—400	"
Cobalt (compressed powder).....	3612	1200	.....	3732	0—100	Fizeau
Copper.....	.....	.....	.....	5150	0—100	Dulong & Petit
Do. ....	.....	.....	.....	5650	0—300	"
Do. ....	4443	5550	.....	4998	0—100	Matthiessen
Do. ....	4788	3075	.....	5094	0—100	Fizeau
Do. (native, Lake Superior) .....	4850	2740	.....	5124	0—100	"
Do. ....	.....	.....	.....	5265	0—100	L. Pfaff
Do. ....	.....	.....	.....	5233	0—100	Rodwell
Do. ....	.....	.....	.....	5115	0—100	Glatzel
Copper-Gold Alloy (66·6 % by mass, 48·06 % by volume, of Gold)....	4015	6420	.....	4657	0—100	Matthiessen
Copper Oxide (CuO.)....	27	3150	.....	342	0—100	Fizeau
Corundum.....	1443	3275	.....	1771	0—100	"
Darcel's fusible metal (Bi <sub>13</sub> Sn <sub>10</sub> Pb <sub>8</sub> ).....	.....	.....	.....	52143	0— 35	Spring
.....	.....	.....	.....	—36926	35— 50	"
.....	.....	.....	.....	102534	50— 90	"
Diopside.....	.....	.....	.....	2330	0—100	F. Pfaff.
Ebonite (See Vulcanite)..	.....	.....	.....	.....	.....	
*Emerald .....	16	1900	.....	206	0—100	Fizeau
Epidote.....	2027	3830	.....	2410	0—100	"
Felspar (Adular).....	1399·5	1900	.....	1590	0—100	"
Fluorspar.....	.....	.....	.....	5851	0—100	F. Pfaff
Galena .....	.....	.....	.....	5578	0—100	"
Garnet .....	.....	.....	.....	2543	0—100	"
German Silver.....	.....	.....	.....	5509	0—100	L. Pfaff
Glass (crystal of Choisy-le-Roy).....	2231	50	.....	.....	100—280	Bosscha †
Do. do. ....	2523	70	.....	.....	"	"
Do. do. ....	2439	300	.....	.....	"	"
Do. (ordinary)...	2578	1330	0·37	.....	"	"

\* See also Beryl.

† Bosscha's constants were obtained by a recalculation of Regnault's experimental results.

SUBSTANCE.	$a \times 10^3$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^8$	Temperature Range. ( $^{\circ}\text{C}.$ )	OBSERVER.
Glass (crystal of Choisy-le-Roy) (ordinary).....	2507	1920	0.51	.....	100—280	Bosscha *
Do. do. ....	2281	1540	0.46	.....	"	"
Do. (green).....	2143	890	0.37	.....	"	"
Do. (Swedish) ...	2218	3570	1.15	.....	"	"
Do. (crystal, Choisy-le-Roy) {	.....	.....	.....	2270	0—10	Regnault
	.....	.....	.....	2270	0—50	"
	.....	.....	.....	2280	0—100	"
	.....	.....	.....	2300	0—150	"
	.....	.....	.....	2310	0—200	"
	.....	.....	.....	2320	0—250	"
	.....	.....	.....	2330	0—300	"
	.....	.....	.....	2340	0—350	"
	.....	.....	.....	2628	0—10	"
	.....	.....	.....	2687	0—50	"
Do. (ordinary) {	.....	.....	.....	2761	0—100	"
	.....	.....	.....	2835	0—150	"
	.....	.....	.....	2908	0—200	"
	.....	.....	.....	2982	0—250	"
	.....	.....	.....	3056	0—300	"
	.....	.....	.....	3131	0—350	"
	.....	.....	.....	2580	0—100	Dulong & Petit
	.....	.....	.....	2750	0—200	"
Do. (rod) ..... {	2410	1700	.....	3040	0—300	"
Do. (tube) .....	.....	.....	.....	2435	0—100	Lavoisier & LaPlace
Do. (plate).....	.....	.....	.....	2673	0—100	"
Do. (crown plate).....	.....	.....	.....	2627	0—100	"
Do. do. ....	.....	.....	.....	2693	0—100	"
Do. do. ....	.....	.....	.....	2753	0—100	"
Do. (thin tube).....	588	31500	.....	.....	0—30	Hällström
Do. (white, French). ..	.....	.....	.....	2553	0—100	Kopp
Do. (white, tube).....	.....	.....	.....	2648	0—100	Regnault
Do. ( do. globule)....	.....	.....	.....	2592	0—100	"
Do. ( do. do. )....	.....	.....	.....	2514	0—100	"

\* Bosscha's constants were obtained by a recalculation of Regnault's experimental results.

SUBSTANCE.	$a \times 10^8$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^8$	Temperature Range. ( $^{\circ}C.$ )	OBSERVER.
Glass (green, tube).....	.....	.....	.....	2299	0—100	Regnault.
Do. ( do. globule)....	.....	.....	.....	2132	0—100	"
Do. (Swedish, tube)....	.....	.....	.....	2363	0—100	"
Do. ( do. globule)...	.....	.....	.....	2441	0—100	"
Do. (hard, French, tube)	.....	.....	.....	2142	0—100	"
Do. ( do. globule)	.....	.....	.....	2242	0—100	"
Do. (ordinary), from ...	.....	.....	.....	2431	0—100	"
to...	.....	.....	.....	2758	0—100	"
Do. (ord. crystal, tube).	.....	.....	.....	2101	0—100	"
Do. ( do. globule)	.....	.....	.....	2330	0—100	"
Do. (Choisy-le-Roy crystal) from.....	.....	.....	.....	2144	0—100	"
to..	.....	.....	.....	2442	0—100	"
Do. (St. Gobain).....	2141	2370	.....	2378.4	0—100	Fizeau
Do. (3 pts. of sand, 2 of Pb, and 1 of alkali). .	2187	.....	.....	.....	0—100	Matthiessen
Do. (Thuringian soft, tube) .....	.....	.....	.....	3585	0—100	Weinhold
Do. ( do. vessel)....	.....	.....	.....	3590	0—100	"
Do. (before heating)...	.....	.....	.....	2784	0—100	Crafts
Do. (after having been heated for 100 hours in boiling sulphur)...	.....	.....	.....	2741	0—100	"
Gold.....	4075	3361	.....	4411	0—100	Matthiessen
Do. (cast).....	4229	1245	.....	4353	0—100	Fizeau
Do. (pure).....	.....	.....	.....	4140	0—100	Calvert, Johnson & Lowe
Do. ....	.....	.....	.....	4401	0—100	L. Pfaff
Gutta-percha (purified)..	49600	496000	.....	69500	0— 40	Russner
Gypsum .....	6700	6940	.....	7394	0—100	Fizeau
Do. ....	.....	.....	.....	7500	0—100	F. Pfaff
Hornblende.....	2355	3025	.....	2658	0—100	Fizeau
Ice.....	.....	.....	.....	11250	—20— 0	Brunner
Do .....	.....	.....	.....	15850	—20— 0	Plücker & Geissler
Do .....	.....	.....	.....	3500	—12— 0	Marchand
Indium (cast).....	7424	63570	.....	13782	0—100	Fizeau
Iodine.....	.....	.....	.....	{ 23500 (?) 31231	40.3—107	Billet

SUBSTANCE.	$a \times 10^8$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^8$	Temperature Range. ( $^{\circ}\text{C}.$ )	OBSERVER.
Iodides—						
AgI (crystal) . . . . .	—206·9	—754·5	.....	—282	0—100	Fizeau
Do. (compressed precipitate) . . . . .	—218	—2400	.....	—458 *	0—100	“
Do. (cast) . . . . .	—249	—2100	.....	—249	0—100	“
Do. . . . .	.....	.....	.....	—1749	70—142	Rodwell
Do. . . . .	.....	.....	.....	—450000	142—145·5	“
Do. . . . .	.....	.....	.....	2844	145·5—300	“
Do. . . . .	.....	.....	.....	—8610	—60—142	“
Do. . . . .	.....	.....	.....	2843	142—400	“
Pb.I <sub>2</sub> (cast) . . . . .	9378·6	8760	.....	—10255	0—100	Fizeau
Do. . . . .	.....	.....	.....	7614	0—205	Rodwell
Do. . . . .	.....	.....	.....	8317	0—205	“
Do. . . . .	.....	.....	.....	63780	205—253	“
Do. . . . .	.....	.....	.....	18000	253—M.P.	“
Hg.I <sub>2</sub> (cast) . . . . .	.....	.....	.....	9523	0—200	Rodwell & Elder
Iridium (cast) . . . . .	2005	1185	.....	2124	0—100	Fizeau
Iron (forged) . . . . .	.....	.....	.....	3661	0—100	Lavoisier & LaPlace
Do. (wire drawn) . . . . .	.....	.....	.....	3705	0—100	“
Do. (soft) . . . . .	3408	2775	.....	3684	0—100	Fizeau
Do. (cast, grey) . . . . .	3019	2055	.....	3235	0—100	“
Do. (cast) . . . . .	.....	.....	.....	3360	0—100	Calvert, Johnson & Lowe
Do. (wrought) . . . . .	.....	.....	.....	3570	0—100	“
Do. . . . .	.....	.....	.....	3742	0—100	L. Pfaff
Do. . . . .	.....	.....	.....	3307	0—100	Rodwell
Do. . . . .	.....	.....	.....	4161	0—100	Glatzel
Iron-glance (oxide, rhombohedral) . . . . .	2244	3215	.....	2565	0—100	Fizeau
Iron-stone (magnetite) . . . . .	.....	.....	.....	2862	0—100	F. Pfaff
Iron Pyrites . . . . .	.....	.....	.....	3025	0—100	“
Do. . . . .	.....	.....	.....	2721	39·5—40·5	Fizeau
Lipowitz's Fusible Metal (Bi <sub>11</sub> Pb <sub>6</sub> Cd <sub>4</sub> Sn <sub>5</sub> ) . . . . .	.....	.....	.....	15400	0—25	Spring
Do. . . . .	.....	.....	.....	—39514	25—40	“
Do. . . . .	.....	.....	.....	38381	40—60	“
Lead . . . . .	8177	2220	.....	8399	0—100	Matthiessen

\* The negative coefficient shewn qualitatively to extend to  $-10^{\circ}\text{C}.$

SUBSTANCE.	$a \times 10^8$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^6$	Temperature Range. ( $^{\circ}\text{C}.$ )	OBSERVER.
Lead (pure).....	.....	.....	.....	9030	0—100	Calvert, Johnson & Lowe
Do. (cast).....	8485	3585	.....	8844	0—100	Fizeau
Do. ....	.....	.....	.....	8725	0—100	L. Pfaff
Do. ....	.....	.....	.....	9063	0—100	Rodwell
Do. ....	.....	.....	.....	8808	0—100	Glatzel
Lead - Antimony alloy } (Sn, Pb, 22.28 % by vol. of Pb).....	6200	9880	.....	7188	0—100	Matthiessen
Do. (Sn Pb, 82.09 % by vol. of Pb).....	8087	3320	.....	8419	0—100	"
Magnesium (cast).....	7261	10260	.....	8286	0—100	Fizeau
Do. ....	.....	.....	.....	7042	0—100	L. Pfaff
Nickel (comp. powder)...	3752	1065	.....	3858	0—100	Fizeau
Osmium (semi-fused)....	1709	3270	.....	2037	0—100	"
Palladium.....	3032	2800	.....	3312	0—100	Matthiessen
Do. (forged, annealed)	3370	1980	.....	3567	0—100	Fizeau
Paraffin.....	58400	99200	.....	.....	0—33	Russner
	.....	.....	.....	260000	33.5—37.7	"
	.....	.....	.....	666000	37.7—41	"
	115000 *	690000 *	.....	.....	41—52	"
Do. (high boiling point).....	.....	.....	.....	31985	0—15.55	Rodwell
	.....	.....	.....	39090	15.55—37.6	"
	.....	.....	.....	143118	37.6—48.85	"
	.....	.....	.....	244358	48.85—61.11	"
Do. (Rangoon, melting at $56^{\circ}\text{C}$ )	71651	148890	.....	79989	0—56	Fizeau
Pewter.....	.....	.....	.....	6099	16.6—100	Daniell
Do. ....	.....	.....	.....	5982	16.6—206	"
Phosphorus.....	37988	.....	.....	.....	0—37.5	Erman
Do. ....	38300	.....	.....	.....	0—44	Kopp
Do. ....	20000	11500	.....	20506	0—44	Pisati & de Franchis
Platinum.....	.....	.....	.....	2644	16.6—100	Daniell
Do. ....	.....	.....	.....	2650	0—100	Dulong and Petit
Do. ....	.....	.....	.....	2750	0—300	"
Do. ....	2554	1040	.....	2658	0—100	Matthiessen
Do. (cast).....	2603	1170	.....	2721	0—100	Fizeau

\* These constants are for the formula :— $V_t = V_{41}(1 + at + bt^2)$ .

SUBSTANCE.	$a \times 10^3$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^8$	Temperature Range. ( $^{\circ}C$ )	OBSERVER.
Platinum.....	.....	.....	.....	2583	0—100	L. Pfaff
Do. (commercial)...	.....	.....	.....	2040	0—100	Calvert, Johnson & Lowe
Platinum-iridium alloy (10 % of Ir.) (cast) .....	2561	1140	.....	2675	0—100	Fizeau
Porcelain (Bayeux).....	.....	.....	.....	4950	1000—1400	Deville & Troost
Do. do. ....	.....	.....	.....	6000	about and above 1500	Weinhold
Do. ....	.....	.....	.....	806	0— 99	"
Potassium ..... {	24070	17980	.....	} 24990	0— 50	Hagen
..... {	23800	23870	.....			
Potassium Chromate... {	.....	.....	.....	10570	0— 20	Spring
..... {	.....	.....	.....	10731	0— 60	"
..... {	.....	.....	.....	11344	0—100	"
Potassium Sulphate.... {	.....	.....	.....	9520	0— 20	"
..... {	.....	.....	.....	10037	0— 60	"
..... {	.....	.....	.....	12645	0—100	"
Quartz ..... {	3358	3265	.....	3685	0—100	Fizeau
Do. .... {	.....	.....	.....	3840	0—100	F. Pfaff
Rhodium(semi-fused)....	2453	1215	.....	2574	0—100	Fizeau
Rock Salt.....	11578	6735	.....	12252	0—100	"
Rose's Fusible Metal † ..	6784.7	—181580	553.07†	.....	0— 90	Kopp
Do. (Bi, Sn, Pb)..... {	.....	.....	.....	33575	0— 40	Spring
..... {	.....	.....	.....	—129922	40— 55	"
..... {	.....	.....	.....	54545	55— 90	"
Rubidium Sulphate..... {	.....	.....	.....	9760	0— 20	"
..... {	.....	.....	.....	10020	0— 60	"
..... {	.....	.....	.....	11148	0—100	"
Ruthenium (semi-fused).....	2552	4215	.....	2973	0—100	Fizeau
Rutile ..... {	2196	2225	.....	2419	0—100	"
Selenium (cast)..... {	9702	16725	.....	11376	0—100	"
Do. (crystallized) {	.....	.....	.....	14780	0— 20	Spring
..... {	.....	.....	.....	17430	0— 60	"
..... {	.....	.....	.....	19810	0—100	"

† Kopp uses the formula :— $V_t = V_o (1 + at + bt^2 + ct^3 + dt^4)$ ;  $a, b$ , and  $c$  are given in the table;  $d = 10^{-13} \times 5256$ .

‡ Erman gives the formula :— $V_t = V_o (1 + 10^{-8} \cdot 21864t - 10^{-8} \cdot 93485 \sqrt{(t - 34^{\circ}.9)(78^{\circ}.5 - t)})$ , the temperatures being expressed in Reaumur degrees and the imaginary values of the irrational factor being put equal to 0.

SUBSTANCE.	$a \times 10^8$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^8$	Temperature Range. ( $^{\circ}\text{C}.$ )	OBSERVER.
Selenium (com. powder) {	.....	.....	.....	13070	0—20	Spring
	.....	.....	.....	16440	0—60	"
	.....	.....	.....	17510	0—100	"
Silicon (cast).....	2086	2535	.....	2340	0—100	Fizeau
Silver.....	5426	4050	.....	5831	0—100	Matthiessen
Do. (cast) .....	5587	2205	.....	5808	0—100	Fizeau
Do. ....	.....	.....	.....	5516	5—26	Plantamour & Hirsch
Do. ....	.....	.....	.....	5573	0—100	L. Pfaff
Do. ....	.....	.....	.....	5792	0—100	Rodwell
Silver-platinum alloy (33.4 % by mass, and 19.65 % by vol, of Pt.).....	4246	3220	.....	4568	0—100	Matthiessen
Sodium.....	14178	52000	26	16674	0—40	de Lucchi.
Do. ....	.....	.....	.....	23670	0—90	"
Do. .... {	20510	22730	.....	21630	0—50	Hagen
	20280	25730	.....			
Solder (2 parts Pb, 1 Sn.) .....	.....	.....	.....	7524	0—100	Smeaton
Speculum Metal.....	.....	.....	.....	5799	0—100	"
Steel (not tempered).....	.....	.....	.....	3238	0—100	Lavoisier & LaPlace
Do. (tempered yellow) .	.....	.....	.....	4158	0—100	"
Do. (French cast, tempered).....	.....	.....	.....	4086	0—100	Fizeau
Do. (French cast, annealed).....	.....	.....	.....	3339	0—100	"
Do. (English cast, annealed).....	3103	2280	.....	3331	0—100	"
Do. (wire drawn).....	.....	.....	.....	3768	0—100	Glatzel
Do. (soft).....	.....	.....	.....	3090	0—100	Calvert, Johnson & Lowe
Do. (bar at max. softness).....	.....	.....	.....	3270	0—100	"
Do. (same bar at max. hardness).....	.....	.....	.....	4260	0—100	"
Sulphur .....	10458	265880	—146.73	.....	0—78	Kopp
Do. ....	—83804	7878840 §	.....	.....	78—115	"
Do. (Sicilian crystal).....	15222	50440	.....	20244	0—100	Fizeau
Do. (crystallized from solution in Carbon Bisulphide) {	.....	.....	.....	21220	0—20	Spring
	.....	.....	.....	24380	0—60	"
	.....	.....	.....	35410	0—100	"

§ These constants are for the formula:— $V_t = V_{78} (1 + a(t - 78) + b(t - 78)^2)$

SUBSTANCE.	$a \times 10^8$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^8$	Temperature Range. ( $^{\circ}C$ )	OBSERVER.
Sulphur (Sicilian).....	.....	.....	.....	24300	0— 20	Spring
Do. ....	.....	.....	.....	25000	0— 60	"
Do. ....	.....	.....	.....	26000	0—100	"
Do. (crystallized from solution in Carbon Bi-sulphide)	12800	186000	153	20468	0— 60	Russner
Do. (crystal).....	.....	.....	.....	17596	20.5—21.5	Schrauf
Do. (natural crystal) {	.....	.....	.....	19991	0— 60	Seichilone
	.....	.....	.....	—4410	62— 70	"
	.....	.....	.....	28483	70—110	"
Do. (after heating to 140 $^{\circ}C$ ) {	.....	.....	.....	20958	0— 82	"
	.....	.....	.....	—13731	82— 85	"
	.....	.....	.....	201700	85—100	"
Do. (after heating to 240 $^{\circ}C$ ) {	.....	.....	.....	18246	0— 90	"
	.....	.....	.....	—23685	90— 92	"
	.....	.....	.....	195180	92—100	"
Tellurium (crystallized) {	.....	.....	.....	10320	0— 20	Spring
	.....	.....	.....	11210	0— 60	"
	.....	.....	.....	11060	0—100	"
Do. (comp. powder) {	.....	.....	.....	10410	0— 20	"
	.....	.....	.....	10110	0— 60	"
	.....	.....	.....	10630	0—100	"
Do. (cast) .....	4335	8625	.....	5196	0—100	Fizeau
Thallium (cast) .....	7694	17115	.....	9405	0—100	"
Tin.....	6100	7890	.....	6889	0—100	Matthiessen
Do. (Malacca, compres'd powder).....	6281	5265	.....	6807	0—100	Fizeau
Do. (pure) .....	.....	.....	.....	6567	0—100	L. Pfaff
Topaz .....	.....	.....	.....	2137	0—100	F. Pfaff
Tourmaline.....	.....	.....	.....	2181	0—100	"
Type Metal .....	.....	.....	.....	6099	16.6—100	Daniell
Do. ....	.....	.....	.....	5856	16.6—264	"
Vulcanite.....	18300	114000	.....	24239	16.7—35.4	Kohlrausch
Do. ....	.....	.....	.....	24600	18— 19	Fuess
Do. (22.2 per cent. of Sulphur) .....	.....	.....	.....	40000	20— 60	Russner



SUBSTANCE.	$a \times 10^8$	$b \times 10^{11}$	$c \times 10^{10}$	Mean Co-efficient $\times 10^8$	Temperature Range. ( $^{\circ}\text{C}.$ )	OBSERVER.
Vulcanite (27 per cent. of Sulphur) .....	.....	.....	.....	35000	20— 60	Russner
Do. (30.7 per cent. of Sulphur) .....	.....	.....	.....	23000	20— 60	"
Do. (31 per cent. of Sulphur) .....	.....	.....	.....	41000	20— 60	"
Do. (36.4 per cent. of Sulphur) .....	.....	.....	.....	38000	20— 60	"
Wcod's Fusible Metal { ( $\text{Bi}_4 \text{ Pb Cd}_2 \text{ Sn}_2$ )...}	.....	.....	.....	-16600	0— 25	Spring
	.....	.....	.....	27827	25— 70	"
Zinc .....	.....	.....	.....	8919	16.6—100	Daniell
Do. ....	8222	7000	.....	8928	0—100	Matthiessen
Do. (pure, rolled).....	.....	.....	.....	6600	0—100	Calvert and Lowe
Do. (compres'd powder)	8906	1905	.....	8715	0—100	Fizeau
Do. ....	.....	.....	.....	8663	0—100	Rodwell

## LIST OF PAPERS BY OBSERVERS CITED IN ABOVE TABLE.

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II.—*Occultations of Fixed Stars by the Moon: Prediction for a given place by a Graphical Method.* By W. F. KING, B.A.

(Communicated by E. Deville, May 23, 1888).

The distance of the star being so great as to be practically infinite, the shadow of the moon is cylindrical, and the position of the place of observation with reference to this shadow can be found by considering the orthographic projection of the moon's disk and the place upon a plane at right angles to the straight line joining the star with the centre of the earth.

$\phi'$  being the geocentric latitude and  $\rho$  the earth's central radius at the place, the observer moves with the diurnal motion of the earth in a circle whose radius is  $\rho \cos \phi'$ , and whose centre is at a distance  $\rho \sin \phi'$  from the earth's centre. The motion in the circle is uniform at the rate of  $15^\circ$  in one sidereal hour, or  $15.04$  in one hour of mean time.

Projected on the plane perpendicular to the line joining the star with the earth's centre, this circle becomes an ellipse whose major axis is  $\rho \cos \phi'$  and minor axis  $\rho \sin \phi' \sin \delta$ — $\delta$  being the star's declination. Points on the circumference of the circle are projected into the points where ordinates to the major axis meet the ellipse. The hour angle of the star at any instant being given, the place of the observer at that time will be that point of the ellipse whose eccentric angle, measured from the minor axis, is that hour angle.

In the American Ephemeris, the hour angle of the star at the time of geocentric conjunction in R. A. is given (in the column headed H). This hour angle, corrected for difference of longitude between Washington and the place, and applied as above, locates the observer at the time of conjunction. His place on the ellipse at any mean time-interval before or after conjunction is found by increasing or decreasing the eccentric angle by  $15.04$  per hour. (The mean solar hour is the time unit of the tabular quantities  $x'$ ,  $y'$ , in the Ephemeris).

Measuring from the centre of the ellipse a distance  $\rho \sin \phi' \cos \delta$  along the minor axis, we have the centre of the earth, which is the origin of coördinates for the moon's place. The axis of  $y$  is in the direction of the minor axis of the ellipse and the axis of  $x$  perpendicular thereto.

The coördinates of the moon's centre at conjunction are 0 and  $Y$ ,  $X$  being equal to 0 at conjunction, and  $Y$  being given in the Ephemeris. The quantities  $x'$  and  $y'$  are the hourly changes of  $X$  and  $Y$ ; (for purposes of prediction  $x'$  and  $y'$  may be considered as constant, the moon moving approximately in a straight line with uniform velocity).

Thus the coördinates of the moon's centre are:—

At conjunction	-	-	-	0 and $Y$
At one hour after conjunction	-	-	-	$x$ and $Y + y'$

Plotting these two points and joining them by a straight line, we have the track of the moon's centre during the hour following conjunction. Proportional parts of this length laid off along this line give the moon's place at any required interval from conjunction.

In this manner we may find for different times, pairs of corresponding positions of the moon's centre and the place of observation. If the measured distance between corresponding points be exactly equal to the moon's radius, the star will then appear to the observer to be on the edge of the moon's disk, and either the immersion or the emersion takes place at that instant.

If at a first trial such a pair of points be not found, two pairs, corresponding to two instants near together, must be found such that at one the distance is greater, and at the other less, than the radius of the moon. Then by proportion the instant at which the distance is equal to the radius may be found with sufficient exactness.

The intervals from geocentric conjunction having been thus found for immersion and emersion, they must be subtracted from or added to the Washington M. T. of conjunction, which is given in the Ephemeris, in order to obtain the Washington M. T. of the immersion and emersion as seen from the place. Correcting them for longitude, we have the local mean times at which the events will take place.

By plotting, for the instant of immersion or emersion, the positions of the centre of the moon and the observer, we can measure with a protractor the angle of the position of the star on the moon's limb from the north point thereof, it being the angle between the straight line or radius of the moon joining those two points and the direction of the axis of  $y$ . This angle is used for setting with an equatorially mounted telescope.

For use with an altitude and azimuth instrument, the angle of position from the highest point, or vertex of the moon's limb, is required. This is the angle, which may also be measured with a protractor, between the same radius of the moon and the straight line joining the centre of the earth with the observer's position, since this last straight line is the projection of the vertical line of the observer, if the small difference of direction of the vertical line and the central radius be neglected.

The linear unit employed in the Ephemeris for the tabulated quantities  $Y, x', y'$ , is the earth's equatorial radius. The moon's radius in terms of this unit is 0.2723.

The following example, with the figure, will indicate more clearly the practical use of this method. The linear scale of the figure is one-sixtieth of an inch equal to .002 of the equatorial radius, which is a convenient working scale.

Required the time of immersion and emersion, and the angles of position, of the star 68 Orionis, at Ottawa, January 25th, 1888. Latitude,  $45^{\circ} 23'$ . Longitude,  $5.4m$ . E. of Washington :—

From table in Appendix to American Ephemeris	$\log \cos \phi = 9.84659$	$\log \sin \phi = 9.85235$
	$\log F = 0.00076$	$\log G = 0.00225$
<hr/>		
$\delta = + 19^{\circ} 48' 8$	$\log \rho \cos \phi' = 9.84735$	$\log \rho \sin \phi' = 9.85010$
	$\log \sin \delta = 9.53014$	$\log \cos \delta = 9.97350$
	<hr/>	<hr/>
	9.37749	9.82360
<hr/>		
whence	$\rho \cos \phi' = 0.7036$	
	$\rho \cos \phi' \sin \delta = 0.2385$	
	$\rho \sin \phi' \cos \delta = 0.6662$	
<hr/>		
From Ephemeris :—	Washington Hour Angle at Geocentric Conjunction	+ 0 59.9
	Difference of Longitude, Washington to Ottawa	— 0 5.4
	Ottawa Hour Angle at Geocentric Conjunction	+ 1 05.3
		<hr/>
		= $16^{\circ} 32.5$

In the figure  $AB$  and  $AH$  are drawn at right angles to one another, each equal to  $\rho \cos \phi' = 0.7036$ .  $AP = 0.2385$ ,  $AC = 0.6662$ .

$C$  is then the centre of the earth, and  $B$  and  $P$  the extremities of the major and minor axes of the elliptic path of the observer. The star being above the equator, the part of the ellipse below the line  $AB$  is taken.

The angle  $HAH_0$  is made equal to  $16^\circ.3$  to the east of  $AH$ , since the hour angle is positive and the place is therefore east of the star.

The angles  $H_0AH_1$ ,  $H_0AH'$ ,  $H'AH''$ , are each made equal to  $15^\circ.04$ .

From  $H_1$ ,  $H_0$ ,  $H'$ ,  $H''$  perpendiculars are drawn to  $AB$ , meeting it in  $A_1$ ,  $A_0$ ,  $A'$ ,  $A''$ .

The proportional compasses are now set to the ratio  $AH : AP$ , and the perpendiculars from  $H_1$ , &c, are divided in the points  $P_1 P_0 P' P''$  by means of the compasses in this ratio.

These latter points are points on the ellipse.  $P_0$  represents the observer's position at the time of Geocentric Conjunction,  $P_1$  at one hour before,  $P'$  at one hour after, and  $P''$  at two hours after.

From the Ephemeris are found  $Y = +0.3659$ ,  $x' = 0.5686$ ,  $y' = +0.0358$ .

$CM_0$  is taken equal to  $.3659$ ,  $M_0$  being above  $C$ , because  $Y$  is positive.

$M_0D$  is drawn equal to  $y' = +0.0358$ , still upwards because positive.

$DM'$  is drawn at right angles equal to  $x' = .5686$ , always to the right, being always positive.

$M_0$  is then the position of the moon's centre at conjunction,  $M'$  its position one hour after. On  $M_0M'$  produced take  $M_0M_1$  and  $M'M''$  each equal to  $M_0M'$ . Then  $M_1$  is the moon's position one hour before conjunction, and  $M''$  two hours after conjunction.

Hence the points  $M_1$ ,  $M_0$ ,  $M'$ ,  $M''$  correspond to  $P_1$ ,  $P_0$ ,  $P'$ ,  $P''$  respectively.

By measurement we find:—

$$\begin{array}{ll} P_1M_1 = .5944 & P_0M_0 = .2130 \\ P'M' = .2096 & P''M'' = .6264 \end{array}$$

Hence the two points at which  $PM = .2723$ , lie one between  $P_1$  and  $P_0$ , and the other between  $P'$  and  $P''$ , and the time of immersion is found by:—

$$\tau = \frac{2723 - 2130}{5944 - 2130} \text{ of an hour} = 9.6 \text{ minutes.}$$

and of emersion by

$$\tau = \frac{2723 - 2096}{6264 - 2096} \text{ of an hour} = 9.0 \text{ minutes.}$$

Hence we have for a first approximation:—

Immersion at 9.6m before conjunction.

Emersion at 1h 09.0m after conjunction.

For a closer approximation we may now plot in two points, one 10 minutes before conjunction, and the other 1h 10m after conjunction, making the angles  $H_0Ah$ ,  $H'Ah'$  each equal to  $2\frac{1}{2}^\circ$  and proceeding as before,  $p$  and  $p'$  being the corresponding points on the ellipse,  $m$  and  $m'$  are the corresponding points on the moon's path,  $mM_0$  and  $m'M'$  being each one-sixth of  $M_0M'$ .

Then we have by measurement:—

$$M_0P_0 = .2130 \quad mp = .2750$$

whence we get

$$\tau_1 = 9.6 \text{ minutes agreeing with the former result. } M'P' = .2096, m'p' = .2776$$

whence  $\tau_2 = 9.2 \text{ minutes.}$

Hence the immersion and emersion respectively take place 9·6 minutes before and 1h 09·2m after conjunction.

From the Ephemeris we have

	H.	M.		H.	M.		H.	M.
Washington M. T. of conjunction	10	45·7						
And difference of longitude	=	—0	5·4					
Ottawa M. T. of conjunction	=	10	51·1					
Therefore Ottawa M. T. of Immersion	=	10	51·1	—	09·6	=	10	41·5
And “ “ Emersion	=	10	51·1	+	1 09·2	=	12	00·3

The angle of position of the star at immersion measured from the north point of the moon's limb towards the east is the angle between the directions  $\mu\pi$  and HA or,  $74^\circ$ ,  $\mu$  and  $\pi$  being the final positions of the moon and the observer at the calculated instant of immersion.

Similarly for emersion the angle is that between the directions  $\mu'\pi'$  and HA or  $283^\circ$ .

The angles of position from the vertex of the moon's limb are the angles between  $\mu\pi$  and  $C\pi$  and between  $\mu'\pi'$  and  $C\mu'$  or  $52\frac{1}{2}^\circ$  and  $243^\circ$  respectively.

The working out of this example by the usual method of calculation throughout, would be as follows:—

			H.	M.	
Washington Hour Angle at Geoc. Conjunction	= $H$	= + 0	59·9		
Longitude of Ottawa	.	.	= $\lambda$	= - 0 05·4	
Ottawa Hour Angle	.	.	= $H - \lambda$	= + 1 05·3	
Arguments: } $h = 1\ 05\cdot3$ $= +\ 57$ $\phi = 45^{\circ}\ 23$	From Downes' Table in American Ephemeris		$\tau = + 0$	31	
			M.	H.	M.
			$\tau - 30$	= 0	01
			$\tau + 30$	= 1	01
			M.	H.	M.
Reduced to Sidereal Time	$\tau - 30$	= 0	01·003		
	$\tau + 30$	= 1	01·167		

And for approximate time of

Immersion—Hour Angle $\theta_1$	$= 1\ 05\cdot3 + 0\ 01\cdot003 = 16\cdot576$
Emersion “ “ $\theta_2$	$= 1\ 05\cdot3 + 1\ 01\cdot167 = 31\cdot617$

Also for this approximate time

$$\begin{aligned} \text{Of Immersion } x &= X + x' \times \frac{1}{60} = + 0\cdot0095 \\ y &= Y + y' \times \frac{1}{60} = + 0\cdot3665 \\ \text{Of Emersion } x &= X + x' \times \frac{61}{60} = + 0\cdot5781 \\ y &= Y + y' \times \frac{61}{60} = + 0\cdot4023 \end{aligned}$$

For a more accurate time of Immersion we have:—

$\theta = + 16^{\circ}567$	$\log \rho \cos \phi' = 9.84732$	$\log \mu' = 9.41916$	
$\log \cos \theta = 9.98175$	$\log \sin \theta = 9.45528$	$\log \xi = 9.30260$	
$\log \rho \cos \phi' = 9.84732$		$\log \sin \delta = 9.53014$	$y' = + 0.0358$
	$\log \xi = 9.30260$		$\eta' = + 0.0179$
$\log A \cos B = 9.82889$	$\xi = + 0.2007$		
$\log \rho \cos \phi' = 9.85010$	$x = + 0.0095$	$\log \eta' = 8.25190$	$y' - \eta' = + 0.0179$
$\log \cos B = 9.97879$	$x - \xi = - 0.1912$	$\log A \cos B = 9.82889$	
$B = 46^{\circ}399$		$\log \mu' = 9.41916$	$x' = + 0.5686$
$\delta = + 19.813$	$\log A \cos B = 9.82889$		$\xi' = + 0.1770$
	$\log \cos B = 9.83862$	$\log \xi' = 9.24805$	
$B - \delta = 26.586$			$x' - \xi' = + 0.3916$
	$\log A = 9.99027$		
	$\log \sin(B - \delta) = 9.65083$		
		$y = + 0.3665$	
	$\log \eta = 9.64110$	$\eta = + 0.4376$	
		$y - \eta = - 0.0711$	

$\log(x - \xi) = 9.28149n$	$\log(y - \eta) = 8.85187n$	$\log(x' - \xi') = 9.59284$	
	$\log \cos M = 9.54225n$	$\log(y' - \eta') = 8.25285$	
$\log \tan M = 0.42962$			
	$\log m = 9.30962$	$\log \tan N = 1.33999$	
$M = 249^{\circ}602$			
$N = 87^{\circ}383$		$N = 87^{\circ}383$	$\log \cos N = 8.65956$
			$\log(y' - \eta') = 8.25285$
$M - N = 162.219$			
			$\log \frac{1}{n} = 0.40671$

$\log m = 9.30962$	$\log m = 9.30962$
$\log \sin(M - N) = 9.48484$	$\log \cos(M - N) = 9.97874n$
$\log \frac{1}{\kappa} = 0.56500$	$\log \frac{1}{n} = 0.40671$

$\log \sin \varphi = 9.35946$	$\log q = 9.69507n$
$\varphi = 166^{\circ}773$	H.
	$q = -0.4955$

$\log \cos \varphi = 9.98833n$
$\log \kappa = 9.43500$
$\log \frac{1}{n} = 0.40671$

$N = 87.4$
$\varphi = 166.8$
$180^{\circ}$

$\log p = 9.83004n$
H.
$p = - 0.6761$
$q = - 0.4955$

Angle of position  $74.2$  from North Point of Moon's limb.

M.
$p - q = - 0.1806 = - 10.8$

Washington Mean Time of Geocentric Conjunction	H.	M.
	10	45.7
$\tau - 30m$	+	0 01.0
$p - q$	= -	0 10.8
Negative Longitude	= +	0 5.4

Ottawa Mean Time of Immersion	.	.	10	41.3
$\xi = + .2007$			$\eta = + 0.4376$	
$(p - q) \xi' = -.0319$			$(p - q) \eta' = -.0032$	
$X = + .1688$			$H = + 0.4344$	

$$\log .1688 = 9.22737$$

$$\log .4344 = 9.63789$$

$$\log \tan P = 9.58948$$

$$\begin{aligned} \text{Angle of Position from the North Point} &= 74^\circ.2 \\ P &= 21.2 \end{aligned}$$

$$\text{Angle of Position from Vertex} = 53.0$$

Comparing the results by the graphical with those by the logarithmic method, we have

	BY GRAPHICAL METHOD	BY LOGARITHMS
	H. M.	H. M.
Time of Immersion	10 41.5	10 41.3
Angle from North Point	74°	74°.2
Angle from Vertex	52½	53

Calculating the Emersion by logarithms in the same way we have the results

	H. M.
12 00.3, 282° 8, and 243° 0	
against 12 00.3, 283°, and 243° as found by the graphical method.	

As another example, take the occultation of 80 Virginis, 24th April, 1888, at Kamloops, B. C. Here we get as results by the graphical method:—

	H.	M.
Mean Time of Immersion	11	59.3
“ “ Emersion	12	43.0
Position angles from the North Point	66° 75 and 347°	

The corresponding results by logarithms are

	H.	M.
Mean Time of Immersion	11	59.5
“ “ Emersion	12	43.6
Position angles	66° 57 and 347° 45	

As compared with the graphical method, that by logarithms has the disadvantages of being much longer, and affording greater opportunity for mistake, angles in all four quadrants being dealt with. Further, when the computed time falls far from the assumed time, a complete new calculation is required, which is avoided in the graphical method.



The non-occurrence of the occultation, from the moon's centre passing at a distance from the place greater than the moon's radius, is perceived at an early stage in the graphical method.

This method requiring the use of ordinary drawing instruments only, viz.:—straight edge, scale, square, protractor, compasses, and proportional compasses, appears well adapted for the use of field observers.



### III.—*Determination of Time by Transits across the Vertical of Polaris.*

By EDOUARD DEVILLE.

(Read May 23, 1888.)

Every star in its daily revolution twice crosses the vertical of Polaris, once above and once below the pole; and these transits may be used for the determination of time. The second one may or may not be visible.

Generally, it is not possible to observe the transit of both stars across the same vertical and at the same time; the instrument has to be pointed first to one star, Polaris for instance, and then,  $\theta$  seconds later, to the time star. But this case may be brought back to that of simultaneous transits by assuming that instead of the time star actually observed, another one was employed having the same declination, but a right ascension smaller by  $\theta$  seconds.

Let  $P$  be the pole,  $Z$  the zenith,  $S$  and  $S'$  the time star and Polaris,

$$\begin{array}{ll} PM=p=\text{perpendicular to } SM & \phi=\text{Latitude} \\ ZPS=t & \delta, \delta'=\text{declinations} \\ S'PS=A & \alpha, \alpha'=\text{R. ascensions} \\ 90^\circ-MPS=x & \end{array}$$

In the triangle  $ZPM$ , we have:

$$(1) \quad \sin(t+x) = \tan p \tan \phi$$

and in  $SPM$ :

$$(2) \quad \sin x = \tan p \tan \delta$$

Were  $p$  known, the values of  $t+x$  and  $x$  could be deduced from the above formula and  $t$  found by subtraction; but considering that  $t$ ,  $x$ , and  $p$  are small arcs, and that when no great precision is required, the powers of these arcs above the second may be neglected, we may write:—

$$\begin{array}{l} t+x=p \tan \phi \\ x=p \tan \delta \end{array}$$

from which we obtain

$$(3) \quad t=p(\tan \phi - \tan \delta)$$

This formula is easily calculated by means of a table of natural tangents, or it may be put into the following form for logarithmic computation:—

$$(4) \quad t=p \frac{\sin(\phi-\delta)}{\cos \phi \cos \delta}$$

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EXPRESSION OF  $p$

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Let

$$PS' = 90^\circ - \delta' = n$$

In triangle  $S'PM$ , we have :—

$$\tan p = \sin (\angle + x) \tan n$$

which, by neglecting the powers of  $p$  and  $n$  above the second, becomes

$$(5) \quad p = n \sin (\angle + x)$$

Developing  $\sin (\angle + x)$  and neglecting the powers of the small arcs above the second—

$$(6) \quad p = n \sin \angle + nx \cos \angle$$

In triangle  $MPS$ , we have, neglecting the powers of  $p$  and  $x$  above the second—

$$x = p \tan \delta$$

Substituting this value of  $x$  in (6) —

$$p = n \sin \angle + n p \cos \angle \tan \delta$$

or

$$(7) \quad p = n \sin \angle + \frac{n^2}{2} \sin 2 \angle \tan \delta$$

A table of the values of  $p$  has been calculated with this formula and published in the “Manual of Dominion Lands Surveys.” The value of  $\delta'$  used was  $88^\circ 41'$ . For any other value of  $\delta'$ ,  $p$ , as found in the table, must be multiplied by

$$\frac{\cos \delta'}{\cos 88^\circ 41'}$$

The arguments of the table are  $\delta$ , the declination of the time star and  $\angle$ , the difference of right ascension of the two stars.

When the stars are not observed at the same time, let  $T'$  and  $T$  be the times of observation of Polaris and the time star respectively, then :—

$$\angle = (\alpha - \alpha') - (T - T')$$

The time  $t$ , given by (3) or (4), is to be subtracted from or added to the time star's right ascension, according as  $\angle$  is less or more than 12 hours.

The table of  $p$  affords a ready way of finding an approximate value of the azimuth : multiplied by the secant of the pole's altitude, it gives at once the azimuth at the time of observation

$$Az = p \sec \phi$$

The Manual of Dominion Land Surveys prescribes that the azimuths of lines are to be obtained by means of time observations of Polaris and the method described above was devised to enable surveyors to rate their chronometers for such observations. For that purpose, the accuracy of the formula and table are ample : in ordinary circumstances, the error resulting from their use will seldom exceed one quarter of a second.

IV.—*The Longitude of the Toronto Observatory.*

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(Communicated May 25th, 1888.)

## CONTENTS.

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 PART III. By CHARLES CARPMAEL.—Observations and computation of clock errors. Personal equation. Clock comparisons. Combination of results for determination of longitude.

## PART I.

The longitude of the transit instrument at the Magnetic Observatory, Toronto, was determined in 1840, by 18 sets of moon culminating stars giving a result of  $5^{\text{h}} 17^{\text{m}} 19^{\text{s}}$  west of Greenwich, and also by a comparison of chronometers with the Cambridge Observatory. This latter determination gave for the longitude  $5^{\text{h}} 17^{\text{m}} 33^{\text{s}}$ . A mean between these two determinations or  $5^{\text{h}} 17^{\text{m}} 26^{\text{s}}$  was employed as the longitude until September, 1857, when a new value came into use, based on a determination in January, 1857, made by Capt. Ashe, by exchange of signals by telegraph between Toronto and Quebec, the longitude of Quebec having been determined by a similar interchange of signals with the Observatory at Cambridge. No endeavour was made to eliminate the effect of the personal equation of the observers. The determination gave  $5^{\text{h}} 17^{\text{m}} 33^{\text{s}}.49$ , or if we add  $0.29$ , the correction to the longitude of Cambridge, as determined through the Atlantic cable, we obtain for the corrected longitude  $5^{\text{h}} 17^{\text{m}} 33^{\text{s}}.78$ .

There being considerable doubt as to the accuracy of this determination, I arranged with Prof. McLeod to coöperate with me in determining the difference of longitude between the Toronto Observatory and the McGill College Observatory, soon after the observations for the difference between that observatory and the Cambridge Observatory had been taken. The method of work was similar to that described in the paper, on the longitude of McGill Observatory.<sup>1</sup> The only important point of difference was in the determination of the personal equation. In the determination between Cambridge and Montreal the personal equation was obtained from observations taken at both stations; at each station a number of stars of all declinations were observed by both Prof. Rogers and Prof. McLeod, one observer taking the star over the middle group of wires, and

<sup>1</sup> Trans. Roy. Soc. Canada, 1885, vol. iii. sec. iii. p. 114, etc.

the other over the two outside groups. Slight uncertainty in the position of the stars had therefore no influence on the result as they would affect both observers alike. In the case of the determination between Prof. McLeod and myself, however, after we had waited several nights at Montreal without a chance of observing, the time at our disposal being limited, we had to abandon the attempt to get a comparison at Montreal, Prof. McLeod left for Toronto, where I joined him after the observations for longitude were completed, and we then, on September 15th, observed together for personal equation. The Toronto transit instrument had a set of five spider lines only, so stars of various declinations were selected in pairs of as nearly as possible the same declination, one of each pair being observed by Prof. McLeod, the other by myself. The error of the clock was determined from Prof. McLeod's observations and from my own separately, each set being worked up in the same way as that observer employed in the longitude work, and the difference between the clock errors as obtained by the two observers gave a determination of the personal equation. This result would be affected by any errors in the adopted star places, as well as by change in the instrumental errors; the personal equation was not therefore taken as a known quantity in discussing the time exchanges for the final determination of the difference of longitude, but was allowed to enter as an unknown quantity in the equations of condition, the result of the determination on September 15th furnishing one of the equations. We had then seven equations, three furnished by the time exchanges when each observer was at his own station, viz., on August 25th, 30th, 31st; three after exchanging observers, viz., on September 5th, 6th, 11th; and one with both observers at Toronto. The approximate solution of these seven equations for the determination of the difference of longitude, and for personal equation, was effected by the method of least squares.

#### INSTRUMENTS.

The transit instrument at Toronto is by Troughton and Simms, London, England, 1882. It is of 3 inches aperture and 34.5 inches focal length, mounted on a solid stone pier. The equatorial intervals from mean wire of the different wires as determined by numerous observations, both of polar and other stars, was for circle west

$$+ 28.907 \quad + 14.421 \quad - 0.042 \quad - 14.442 \quad - 28.841$$

but in only a very few cases were stars employed in the work which were not observed over all five wires.

The level, also by Troughton and Simms, was supposed to have a scale value of 1", but Prof. McLeod determined the value of the scale of another level by comparison with it, and afterwards independently, which comparisons would give 1".095 for the value of one division of the Toronto level. The Toronto instrument had, prior to this second determination, been broken whilst preparations were going on for accurate measurement of its scale value, so that no such determination could be affected. The value adopted in reducing the observations was 1".05.

The observations were recorded on a chronograph by Cook & Sons, York, England, and were measured off to the hundredth of a second with the aid of a glass scale divided to tenths of a second. The time piece was sidereal clock No. 879 by Chas. Frodsham, London.

## REDUCTION OF THE OBSERVATIONS.

In reducing the observations, Prof. McLeod gave equal weight to all stars, whilst I employed weights obtained from the formula used in the reduction of the observations in the determination of the difference of longitude between Cambridge and Montreal, in the paper already referred to. As there were three exchanges of time with the observers at their own stations, and three after exchange of observers, any error due to the different methods of reduction will be eliminated.

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PART II.

## INSTRUMENTS AT MONTREAL.

*The transit instrument* is by Jones & Son, London, and has recently been refitted with bearings, pivots, and micrometer.

*The striding level* is by Fauth & Co., Washington. The scale value used in the reduction of these observations was 0".146.

*The time-piece* is the "Blackman" mean time clock, by Howard.

*The chronograph* used in this work was of the usual American single-pen cylinder form. It was loaned to the Observatory, by the United States Naval Observatory, through the kindness of the Superintendent, Admiral Shufeldt.

For further details as to instrumental outfit, reference is made to the Transactions of the Royal Society of Canada, Vol. iii. Sec. iii. pp. 112-114.

## STAR PLACES.

The apparent right ascensions of the stars observed were taken from the "Berliner Astronomisches Jahrbuch für 1883," excepting three stars observed at Montreal, two from the American Ephemeris and one from the Nautical Almanac. In Table II, the former are marked by an asterisk (\*), and the latter by a dagger (†). The right ascensions of these stars have been reduced to the Berlin system.

## COMPUTATION OF CLOCK ERRORS.

The method of reducing the observations was in effect as follows:—The observed times of transit were corrected for level and for assumed approximate values of the azimuth, collimation and clock errors. The corrections to these assumed values were then obtained by the method of least squares, giving each observation full weight. In this reduction the collimation error was assumed to be constant throughout the work of a single night, and on no night have the residuals after reduction thrown any doubt on the validity of this assumption. Different values of the azimuth error were assumed for

the two positions of the instrument on each night, but these values were assumed to be constant in each position.

Let  $\varphi$  = Latitude of the place of observation.

$\delta$  = declination of an observed star.

$\alpha$  = right ascension corrected for diurnal aberration.

$A = \sin (\varphi - \delta) \sec \delta$ .

$B = \cos (\varphi - \delta) \sec \delta$ .

$C = \sec \delta$ .

$a$  = approximate azimuth before reversal.

$a' =$  " " after "

$b$  = level error at time of observation corrected when necessary for inequality of pivots.

$c$  = approximate collimation error (the values obtained from the micrometer measurements were always used for this quantity.)

$T$  = mean of observed times, reduced when necessary to the mean wire, (sidereal time).

$\theta$  = reduction to 21 hours for clock rate.

$t$  = approximate clock error at 21 hours, sidereal time. This was generally taken as the arithmetical mean of  $\alpha - (T + Aa + Bb + Cc \pm \theta)$  for all the stars observed in one night.

$da, da', dc, dt$  = corrections to  $a, a', c$  and  $t$ , obtained by least squares.

Then  $\alpha = T + A(a + da) + Bb + C(c + dc) + (t + dt) \pm \theta$ , or if  $R = \alpha - (T + Aa + Bb + Cc + t \pm \theta)$ .

$$Ada + Cdc + dt - R = 0$$

In this form the equations of condition are entered in the following tables.

Prof. G. H. Chandler has shared with me the work of these reductions.



TABLE I.  
LEVEL CORRECTIONS.

Sidereal time.	Observed.	Adopted.	Sidereal time.	Observed.	Adopted.	Sidereal time.	Observed.	Adopted.
MONTREAL TRANSIT.			MONTREAL TRANSIT.			TORONTO TRANSIT.		
1883. h.	s.	s.	1883. h.	s.	s.	1883. h.	s.	s.
Aug. 25, 17.8	-.094	-.10	Aug. 31, 19.0	.000	.00	Sept. 6, 18.6	-.340	-.28
" 18.7	-.105	-.10	" 19.3	.000	.00	" 18.9	-.170	-.28
" 19.0	-.073	-.09	" 19.9	.000	.00	" 19.1	.320	.27
" 19.2	-.095	-.09	" 20.3	+.020	+.01	" 19.4	.320	.26
" 19.4	-.082	-.08	" 20.6	+.020	+.03	" 19.6	.260	-.26
" 19.6	-.070	-.07	" 21.3	+.050	+.05	" 19.9	-.150	-.26
" 19.9	-.050	-.05	" 22.2	+.050	+.05	" 20.3	-.320	-.25
<i>Reversed.</i>			<i>Reversed.</i>			<i>Reversed.</i>		
" 21.8	.000	.00	" 22.2	+.210	+.20	" 22.2	-.010	-.03
" 22.2		-.05	" 22.7	+.180	+.19	" 22.7		-.02
" 22.5	-.083	-.08	" 23.4	+.210	+.20	" 23.2	.000	.03
Aug. 30, 19.0	+.082	+.03	" 23.8	+.210	+.21	" 23.4	-.049	.03
" 19.4	+.040	+.05	TORONTO TRANSIT.			" 23.8	-.020	-.04
" 19.9	+.050	+.05	1883. h.			Sept. 11, 18.5	-.280	-.31
" 20.3	+.050	+.05	Sept. 5, 19.6	-.210	-.20	" 19.1	-.340	-.32
<i>Reversed.</i>			" 19.9	-.170	-.18	" 19.4	-.310	-.34
" 22.0	+.090	+.09	" 20.3	-.160	-.14	" 19.6		-.36
" 22.2	+.060	+.08	" 20.8		-.07	" 19.9	-.405	-.38
" 22.5		+.07	" 21.1	-.010	-.02	" 20.3	-.355	-.39
" 22.8	+.070	+.07	<i>Reversed.</i>			<i>Reversed.</i>		
" 23.3	+.080	+.08	" 22.5	-.280	.28	" 21.3	-.180	-.22
			" 22.8		.35	" 21.7	-.275	-.23
			" 23.2	-.420	-.39	" 22.3		-.25
			" 23.4	-.380	.39	" 22.7	-.225	-.25
			" 23.6		-.33	" 23.2	-.283	-.24
			" 23.9	-.270	-.27	" 23.4	-.195	-.22

TABLE II.  
OBSERVATIONS OF AUGUST 25, 1883, MONTREAL.

LAMP EAST.													
Name of star.	<i>a.</i>			<i>δ.</i>		<i>T.</i>			No. of wires.	<i>B.</i>	<i>b.</i>	Equations of condition.	Residuals.
	<i>h.</i>	<i>m.</i>	<i>s.</i>	<i>o</i>	<i>r</i>	<i>h.</i>	<i>m.</i>	<i>s.</i>					
<i>b</i> Draconis . . .	18	22	14.37	+	58 44	18	22	46.60	15	+1.87	-.10	-0.44 <i>da</i> +1.93 <i>dc</i> + <i>dt</i> -.02=0	-.03
<i>χ</i> Draconis . . .	18	23	11.62	+	72 41	18	23	44.55	7	+2.99	-.10	-1.54 <i>da</i> +3.36 <i>dc</i> + <i>dt</i> +.04=0	+.02
23 H. Camel . . .	18	26	19.06	+	100 19	18	26	48.68	13	-3.23	-.10	+4.58 <i>da</i> -5.58 <i>dc</i> + <i>dt</i> +.03=0	+.06
<i>α</i> Lyræ . . .	18	33	01.49	+	38 41	18	33	33.26	15	+1.27	-.10	+0.16 <i>da</i> +1.28 <i>dc</i> + <i>dt</i> -.13=0	-.13
<i>β</i> Lyræ . . .	18	45	48.65	+	33 14	18	46	20.44	15	+1.17	-.09	+0.26 <i>da</i> +1.20 <i>dc</i> + <i>dt</i> -.04=0	-.04
<i>σ</i> Sagittarii . . .	18	48	04.77	-	26 26	18	48	36.33	15	+0.35	-.09	+1.06 <i>da</i> +1.12 <i>dc</i> + <i>dt</i> +.18=0	+.18
<i>ο</i> Draconis . . .	18	49	31.12	+	59 15	18	50	03.44	13	+1.90	-.09	-0.46 <i>da</i> +1.96 <i>dc</i> + <i>dt</i> +.08=0	+.07
R. Lyræ . . .	18	51	49.41	+	43 48	18	52	21.27	15	+1.38	-.09	+0.01 <i>da</i> +1.38 <i>dc</i> + <i>dt</i> -.08=0	-.08
<i>ζ</i> Aquilæ . . .	19	00	05.31	+	13 41	19	00	36.88	13	+0.88	-.09	+0.54 <i>da</i> +1.03 <i>dc</i> + <i>dt</i> -.10=0	-.10
<i>π</i> Sagittarii . . .	19	02	52.39	-	21 12	19	03	23.97	15	+0.42	-.09	+0.99 <i>da</i> +1.07 <i>dc</i> + <i>dt</i> +.16=0	+.16
<i>θ</i> Lyræ . . .	19	12	21.54	+	37 56	19	12	53.35	15	+1.25	-.09	+0.17 <i>da</i> +1.27 <i>dc</i> + <i>dt</i> -.05=0	-.05
<i>κ</i> Cygni . . .	19	14	26.95	+	53 09	19	14	58.99	15	+1.65	-.09	-0.22 <i>da</i> +1.67 <i>dc</i> + <i>dt</i> -.06=0	-.07
Piazzi VII. 67*	19	18	44.33	+	111 18	19	19	14.65	13	-1.12	-.09	+2.50 <i>da</i> -2.75 <i>dc</i> + <i>dt</i> -.17=0	-.19
<i>β</i> Cygni . . .	19	26	03.52	+	27 43	19	26	35.29	10	+1.08	-.08	+0.35 <i>da</i> +1.13 <i>dc</i> + <i>dt</i> +.01=0	+.01
<i>θ</i> Cygni . . .	19	33	21.47	+	49 57	19	33	53.46	14	+1.55	-.08	-0.12 <i>da</i> +1.55 <i>dc</i> + <i>dt</i> -.03=0	-.04
<i>α</i> Aquilæ . . .	19	45	08.13	+	8 34	19	45	39.74	15	+0.81	-.07	+0.61 <i>da</i> +1.01 <i>dc</i> + <i>dt</i> -.01=0	-.01
<i>ε</i> Draconis . . .	19	48	37.42	+	69 39	19	49	10.13	13	+2.66	-.06	-1.21 <i>da</i> +2.92 <i>dc</i> + <i>dt</i> +.12=0	+.11
<i>ψ</i> Cygni . . .	19	52	39.72	+	52 08	19	53	11.77	15	+1.62	-.06	-0.18 <i>da</i> +1.63 <i>dc</i> + <i>dt</i> +.02=0	-.01
LAMP WEST.													
<i>ε</i> Pegasi . . .	21	38	30.31	+	9 21	21	39	01.79	15	+0.82	.00	+0.60 <i>da'</i> -1.01 <i>dc</i> + <i>dt</i> -.02=0	+.02
11 Cephei*	21	40	18.17	+	70 47	21	40	50.75	7	+2.74	.00	-1.30 <i>da'</i> -3.04 <i>dc</i> + <i>dt</i> +.29=0	+.19
16 Pegasi . . .	21	47	43.34	+	25 23	21	48	19.87	15	+1.04	.00	+0.38 <i>da'</i> -1.11 <i>dc</i> + <i>dt</i> -.07=0	-.04
<i>ι</i> Aquarii . . .	22	00	11.08	-	14 26	22	00	42.49	15	+0.52	-.02	+0.89 <i>da'</i> -1.03 <i>dc</i> + <i>dt</i> +.03=0	+.09
20 Cephei . . .	22	01	32.26	+	62 13	22	02	04.31	8	+2.05	-.02	-0.61 <i>da'</i> -2.15 <i>dc</i> + <i>dt</i> +.00=0	-.05
<i>π</i> Pegasi . . .	22	04	51.63	+	32 37	22	05	23.21	10	+1.16	-.03	+0.27 <i>da'</i> -1.19 <i>dc</i> + <i>dt</i> -.09=0	-.07
<i>ζ</i> Cephei . . .	22	06	52.62	+	57 38	22	07	24.49	12	+1.82	.03	-0.39 <i>da'</i> -1.87 <i>dc</i> + <i>dt</i> -.11=0	-.14
<i>θ</i> Aquarii . . .	22	10	43.57	-	8 21	22	11	15.01	15	+0.60	-.04	+0.81 <i>da'</i> -1.01 <i>dc</i> + <i>dt</i> +.01=0	+.07
Adopted clock-rate, zero.													

Normal equations:

$$\begin{aligned} 0 &= +31.578da - 39.134dc + 7.09dt - 0.260 \\ 0 &= + 4.239da' + 2.909dc + 0.65dt - 0.362 \\ 0 &= -39.134da + 2.909da' + 109.392dc + 4.770dt +.157 \\ 0 &= + 7.090da + 0.650da' + 4.770dc + 26.000dt -.010 \end{aligned}$$

Whence  $da = +.007$ ,  $da' = +.074$ ,  $dc = -.001$ ,  $dt = -.003$ , weight of  $dt = 22.03$   
on this night  $a = +.450$ ,  $a' = +.450$ ,  $c = -.030$ ,  $t = -0$  m. 31.80 sec.  
Whence total azimuth before reversal  $= a + da = +.457$   
" " after "  $= a' + da' = +.524$   
" Collimation (Lamp East)  $= c + dc = -.031$   
Clock error  $= t + dt = -0$  m. 31.803 sec.  
and probable error  $= \pm .015$  sec.

TABLE II. — *Continued.*

OBSERVATIONS OF AUGUST 30, 1883, MONTREAL.

LAMP WEST.														
Name of star.		a.			δ.		T.			No. of wires.	B.	b.	Equations of condition.	Residuals.
		h.	m.	s.	°	'	h.	m.	s.					
π	Sagittarii . .	19	02	52.33	− 21	13	19	03	23.13	15	+0.42	+0.07	+0.98 <i>du</i> +1.07 <i>dc</i> + <i>dt</i> +.09=0	+1.10
θ	Lyrae . . .	19	12	21.45	+ 37	55	19	12	52.25	15	+1.25	+0.06	+0.17 <i>du</i> +1.27 <i>dc</i> + <i>dt</i> −.18=0	−.20
κ	Cygni . . .	19	14	26.83	+ 53	10	19	14	57.88	15	+1.65	+0.06	−0.23 <i>du</i> +1.67 <i>dc</i> + <i>dt</i> −.06=0	−.09
τ	Draconis . .	19	17	50.44	+ 73	09	19	18	22.18	13	+3.05	+0.06	−1.59 <i>du</i> +3.45 <i>dc</i> + <i>dt</i> +.20=0	+1.12
δ	Aquilæ . .	19	19	39.51	+ 2	53	19	20	10.41	15	+0.74	+0.06	+0.68 <i>du</i> +1.00 <i>dc</i> + <i>dt</i> +.08=0	+0.08
ι	Cygni . . .	19	26	48.43	+ 51	29	19	27	19.57	15	+1.60	+0.05	−0.16 <i>du</i> +1.60 <i>dc</i> + <i>dt</i> +.04=0	+0.01
θ	Cygni . . .	19	33	21.37	+ 49	57	19	33	52.56	15	+1.55	+0.05	−0.12 <i>du</i> +1.55 <i>dc</i> + <i>dt</i> +.10=0	+0.07
δ	Cygni . . .	19	41	22.36	+ 44	51	19	41	53.15	7	+1.41	+0.04	+0.02 <i>du</i> +1.41 <i>dc</i> + <i>dt</i> −.26=0	−.28
δ	Sagittæ . .	19	42	13.69	+ 18	15	19	42	44.61	10	+0.94	+0.04	+0.48 <i>du</i> +1.05 <i>dc</i> + <i>dt</i> +.02=0	+0.01
Gr.	1374 . . .	19	46	11.93	+105	46	19	46	41.86	13	−1.84	+0.04	+3.21 <i>du</i> −3.68 <i>dc</i> + <i>dt</i> −.08=0	+0.03
ψ	Cygni . . .	19	52	39.61	+ 52	08	19	53	10.91	15	+1.62	+0.04	−0.18 <i>du</i> +1.63 <i>dc</i> + <i>dt</i> +.17=0	+1.14
Br.	1147 . . .	20	01	49.96	+103	53	20	05	19.71	13	−2.19	+0.04	+3.58 <i>du</i> −4.17 <i>dc</i> + <i>dt</i> −.14=0	−.01
α <sup>1</sup>	Seq. Cygni .	20	10	00.35	+ 46	24	20	10	31.39	15	+1.45	+0.04	−0.02 <i>du</i> +1.45 <i>dc</i> + <i>dt</i> −.03=0	−.05
α <sup>2</sup>	Capricorni .	20	11	37.72	− 12	54	20	12	08.52	15	+0.54	+0.04	+0.88 <i>du</i> +1.02 <i>dc</i> + <i>dt</i> +.04=0	+0.04
LAMP EAST.														
ι	Aquarii . .	22	00	11.09	− 14	26	22	00	41.62	15	+0.52	+0.09	+0.89 <i>du</i> ′ −1.03 <i>dc</i> + <i>dt</i> +.10=0	+1.11
π	Pegasi . . .	22	04	51.64	+ 32	37	22	05	22.41	12	+1.15	+0.09	+0.27 <i>du</i> ′ −1.19 <i>dc</i> + <i>dt</i> −.08=0	−.07
θ	Aquarii . .	22	10	43.58	− 8	21	22	11	14.12	15	+0.60	+0.08	+0.81 <i>du</i> ′ −1.01 <i>dc</i> + <i>dt</i> −.05=0	−.04
30	H. Urs. Maj.	22	15	40.58	+113	51	22	16	10.14	13	−0.92	+0.07	+2.30 <i>du</i> ′ +2.47 <i>dc</i> + <i>dt</i> +.14=0	+1.12
3	Lacertæ . .	22	19	02.28	+ 51	39	22	19	33.49	15	+1.61	+0.07	−0.17 <i>du</i> ′ −1.61 <i>dc</i> + <i>dt</i> +.03=0	+0.04
9	H. Draconis .	22	25	04.32	+103	41	22	25	32.76	12	−2.22	+0.07	+3.59 <i>du</i> ′ +4.23 <i>dc</i> + <i>dt</i> −.08=0	−.11
7	Lacertæ . .	22	26	33.00	+ 49	41	22	27	04.16	15	+1.54	+0.07	−0.12 <i>du</i> ′ −1.54 <i>dc</i> + <i>dt</i> +.02=0	+0.03
η	Aquarii . .	22	29	24.62	− 0	43	22	29	55.20	15	+0.69	+0.07	+0.72 <i>du</i> ′ −1.00 <i>dc</i> + <i>dt</i> +.02=0	+0.03
η	Pegasi . . .	22	37	35.32	+ 29	37	22	38	06.23	15	+1.11	+0.07	+0.31 <i>du</i> ′ −1.15 <i>dc</i> + <i>dt</i> +.07=0	+0.08
λ	Pegasi . . .	22	40	57.89	+ 22	57	22	41	28.66	15	+1.00	+0.07	+0.42 <i>du</i> ′ −1.09 <i>dc</i> + <i>dt</i> +.01=0	+0.02
ι	Cephei . . .	22	45	36.97	+ 65	35	22	46	08.57	23	+2.28	+0.07	−0.83 <i>du</i> ′ −2.42 <i>dc</i> + <i>dt</i> −.04=0	−.03
ο	Androm. . .	22	56	36.90	+ 41	42	22	57	07.73	15	+1.34	+0.08	+0.09 <i>du</i> ′ −1.34 <i>dc</i> + <i>dt</i> −.15=0	−.14
α	Pegasi . . .	22	59	00.04	+ 14	35	22	59	30.64	15	+0.89	+0.08	+0.53 <i>du</i> ′ −1.03 <i>dc</i> + <i>dt</i> −.03=0	−.07
π	Cephei . . .	23	04	18.91	+ 74	46	23	04	51.15	13	+3.33	+0.08	−1.85 <i>du</i> ′ −3.80 <i>dc</i> + <i>dt</i> −.08=0	−.06
Br.	3077 . . .	23	07	44.61	+ 56	31	23	08	16.00	15	+1.78	+0.08	−0.35 <i>du</i> ′ −1.81 <i>dc</i> + <i>dt</i> +.10=0	+1.11
γ	Piscium† . .	23	11	09.99	+ 2	39	23	11	40.60	15	+0.73	+0.08	+0.68 <i>du</i> ′ −1.00 <i>dc</i> + <i>dt</i> +.03=0	+0.04
Adopted clock-rate, −.006 sec. per hour.														

Normal equations:

$$\begin{aligned}
 0 &= +23.228da - 30.001dc + 7.700dt - 0.959 \\
 0 &= +25.517da' + 26.062dc + 7.210dt + 0.205 \\
 0 &= -30.001da + 26.062da' + 126.627dc - 4.000dt + 1.896 \\
 0 &= +7.700da + 7.210da' - 4.000dc + 30.000dt - 0.050
 \end{aligned}$$

Whence.  $da = +.025$ ,  $da' = +.004$ ,  $dc = -.010$ ,  $dt = -.007$ , weight of  $dt = 25.73$   
on this night  $a = +.400$ ,  $a' = +.750$ ,  $c = +.020$ ,  $t = -0$  m. 31.14 sec.

Whence total azimuth before reversal =  $a + da = +.425$   
" " after " =  $a' + da' = +.754$   
" Collimation (Lamp West) =  $c + dc = +.010$   
Clock error =  $t + dt = -0$  m. 31.147 sec.  
and probable error =  $\pm .014$  sec.

TABLE II. — *Continued.*  
OBSERVATIONS OF AUGUST 31, 1883, MONTREAL.

LAMP EAST.													
Name of star.	$\alpha$ .			$\delta$ .		$T$ .			No. of wires.	$B$ .	$b$ .	Equations of condition.	Residuals.
	h.	m.	s.	o.	t.	h.	m.	s.					
$\theta$ Lyræ . . .	19	12	21.43	+	37 56	19	12	52.20	15	+1.25	.00	+0.17 $da$ +1.27 $dc$ + $dt$ - .10 = 0	-.07
$\kappa$ Cygni . . .	19	14	26.79	+	53 09	19	14	57.86	13	+1.65	.00	-0.22 $da$ +1.67 $dc$ + $dt$ + .01 = 0	+0.03
$\delta$ Aquilæ . . .	19	19	39.51	+	2 53	19	20	09.99	11	+0.73	.00	+0.68 $da$ +1.00 $dc$ + $dt$ - .13 = 0	-.07
$h$ Sagittarii . .	19	29	39.33	-	25 08	19	30	09.92	15	+0.37	.00	+1.04 $da$ +1.10 $dc$ + $dt$ + .16 = 0	+0.25
$\delta$ Cygni . . .	19	41	22.34	+	44 50	19	41	53.08	14	+1.41	.00	+0.02 $da$ +1.41 $dc$ + $dt$ - .20 = 0	-.17
$\alpha$ Aquilæ . . .	19	45	08.07	+	8 34	19	45	35.69	15	+0.81	.00	+0.61 $da$ +1.01 $dc$ + $dt$ - .02 = 0	+0.04
$\epsilon$ Draconis . . .	19	48	37.15	+	69 59	19	49	08.89	13	+2.66	.00	-1.21 $da$ +2.92 $dc$ + $dt$ + .19 = 0	+0.17
$\psi$ Cygni . . .	19	52	39.59	+	52 08	19	53	10.82	10	+1.62	.00	-0.18 $da$ +1.63 $dc$ + $dt$ + .19 = 0	+0.21
$\gamma$ Cygni . . .	20	18	05.34	+	39 53	20	18	35.95	15	+1.30	+0.02	+0.13 $da$ +1.30 $dc$ + $dt$ - .25 = 0	-.24
$o$ Urs. Maj. . .	20	20	33.77	+	118 54	20	21	03.97	8	-0.59	+0.02	+1.98 $da$ -2.07 $dc$ + $dt$ + .23 = 0	+0.31
$\theta$ Cephei . . .	20	27	40.88	+	62 36	20	28	11.95	23	+2.07	+0.02	-0.63 $da$ +2.17 $dc$ + $dt$ - .15 = 0	-.15
73 Draconis . . .	20	33	06.97	+	74 34	20	33	38.70	23	+3.29	+0.03	-1.83 $da$ +3.76 $dc$ + $dt$ - .04 = 0	-.09
$v$ Urs. Maj. . .	21	42	40.38	+	120 25	21	43	10.16	13	-0.51	+0.05	+1.91 $da$ -1.98 $dc$ + $dt$ - .23 = 0	-.15
Gr. 1586 . . .	21	47	52.86	+	106 34	21	48	22.22	13	-1.69	+0.05	+3.07 $da$ -3.50 $dc$ + $dt$ - .12 = 0	.00
$\alpha$ Aquarii . . .	21	59	50.42	-	0 53	22	00	20.92	15	+0.69	+0.05	+0.72 $da$ +1.00 $dc$ + $dt$ - .04 = 0	+0.03
20 Cephei . . .	22	01	32.25	+	62 13	22	02	13.58	14	+2.05	+0.05	-0.61 $da$ +2.15 $dc$ + $dt$ + .20 = 0	+0.20
$\pi$ Pegasi . . .	22	04	51.64	+	32 36	22	05	22.36	11	+1.16	+0.05	+0.27 $da$ +1.19 $dc$ + $dt$ - .01 = 0	+0.03
24 Cephei . . .	22	07	39.72	+	71 46	22	08	11.58	13	+2.86	+0.05	-1.42 $da$ +3.20 $dc$ + $dt$ + .36 = 0	+0.33
LAMP WEST.													
3 Lacertæ . . .	22	19	02.28	+	51 39	22	19	33.11	12	+1.60	+0.20	-0.17 $da'$ -1.61 $dc$ + $dt$ + .08 = 0	+0.04
9 H. Draconis . .	22	25	04.34	+	103 41	22	25	32.72	13	-2.24	+0.20	+3.58 $da'$ +4.23 $dc$ + $dt$ - .13 = 0	-.13
7 Lacertæ . . .	22	26	33.00	+	49 41	22	27	03.80	15	+1.54	+0.20	-0.11 $da'$ -1.55 $dc$ + $dt$ + .09 = 0	+0.05
$\eta$ Aquarii . . .	22	29	24.62	-	0 43	22	29	54.94	15	+0.69	+0.20	+0.72 $da'$ -1.00 $dc$ + $dt$ + .11 = 0	+0.06
$\lambda$ Pegasi . . .	22	40	57.90	+	22 57	22	41	28.24	15	+1.00	+0.20	+0.42 $da'$ -1.09 $dc$ + $dt$ - .09 = 0	-.13
$\iota$ Cephei . . .	22	45	36.98	+	65 35	22	46	08.06	15	+2.28	+0.20	-0.83 $da'$ -2.42 $dc$ + $dt$ - .06 = 0	-.15
3 Aquarii . . .	22	48	30.42	-	16 26	22	49	00.65	15	+0.49	+0.20	+0.92 $da'$ -1.04 $dc$ + $dt$ + .14 = 0	+0.08
$\alpha$ Urs. Maj. . .	22	56	29.63	+	117 37	22	56	59.06	13	-0.66	+0.20	+2.05 $da'$ +2.16 $dc$ + $dt$ + .02 = 0	+0.01
$\beta$ Pegasi . . .	22	58	10.41	+	27 27	22	58	40.82	15	+1.07	+0.20	+0.35 $da'$ -1.13 $dc$ + $dt$ - .02 = 0	-.06
$\pi$ Cephei . . .	23	04	18.91	+	74 46	23	04	50.49	12	+3.33	+0.20	-1.85 $da'$ -3.80 $dc$ + $dt$ - .15 = 0	-.20
11 H. Cephei . .	23	42	26.02	+	67 10	23	42	57.28	13	+2.40	+0.21	-0.95 $da'$ -2.58 $dc$ + $dt$ + .08 = 0	+0.03
$\phi$ Pegasi . . .	23	46	36.30	+	18 28	23	47	06.59	15	+0.94	+0.21	+0.48 $da'$ -1.05 $dc$ + $dt$ - .05 = 0	-.10
Adopted clock-rate, -.008 sec. per hour.													

Normal equations:

$$\begin{aligned} 0 &= +27.224da - 33.028dc + 4.500dt - 1.102 \\ 0 &= +24.038da' + 28.515dc + 4.620dt - 0.060 \\ 0 &= -33.028da + 28.515da' + 139.228dc + 8.350dt - 0.273 \\ 0 &= +4.500da + 4.620da' + 8.350dc + 30.000dt + 0.070 \end{aligned}$$

Whence  $da = +.071$ ,  $da' = -.025$ ,  $dc = +.024$ ,  $dt = -.009$ , weight of  $dt = 27.307$   
on this night  $a = +.500$ ,  $a' = +.800$ ,  $c = .000$ ,  $t = -0\text{ m. } 30.94\text{ sec.}$   
Whence total azimuth before reversal  $= a + da = +.571$   
" " after "  $= a' + da' = +.775$   
" Collimation (Lamp East)  $= c + dc = +.024$   
Clock error  $= t + dt = -0\text{ m. } 30.949\text{ sec.}$   
and probable error  $= \pm .020\text{ sec.}$

TABLE II. — *Continued.*

OBSERVATIONS OF SEPTEMBER 5, 1883, TORONTO.

CLAMP WEST.											
Name of star.	$\alpha$ .			$\delta$ .			$T$ .			No. of wires.	Residuals.
	h.	m.	s.	o.	'	"	h.	m.	s.		
$\beta$ Cygni . . .	19	26	03.36	+	27	43	19	21	07.24	5	+0.09
$h$ Sagittarii . .	19	29	39.27	—	25	08	19	24	42.06	4	+0.26
$\gamma$ Aquilæ . . .	19	40	45.30	+	10	20	19	35	49.32	5	+0.34
$\alpha$ Aquilæ . . .	19	45	08.01	+	8	34	19	39	11.72	5	+0.06
$\epsilon$ Draconis . . .	19	48	26.91	+	69	59	19	43	41.00	5	—0.05
$\psi$ Cygni . . .	19	52	39.47	+	52	08	19	47	43.60	5	+0.24
Br. 1147 . . .	20	01	50.42	+	103	54	19	59	53.16	5	—0.30
$\sigma^1$ Seq. Cygni .	20	10	00.25	+	46	24	20	05	04.30	5	+0.26
$\kappa$ Cephei . . .	20	12	52.44	+	77	22	20	07	56.07	3	—0.58
$\theta$ Cephei . . .	20	27	40.76	+	62	36	20	22	44.22	5	—0.38
$\alpha$ Delphini . . .	20	34	15.89	+	15	30	20	29	19.66	5	+0.20
$\alpha$ Cygni . . .	20	37	30.28	+	44	52	20	32	34.04	5	+0.06
$\epsilon$ Cygni . . .	20	41	32.33	+	33	32	20	36	36.12	5	+0.16
$\eta$ Cephei . . .	20	42	58.44	+	61	24	20	38	01.85	3	—0.36
76 Draconis . .	20	51	05.58	+	82	06	20	46	09.64	5	+0.02
$\sigma^2$ Urs. Maj. . .	21	00	06.04	+	112	24	20	54	09.50	5	—0.15
CLAMP EAST.											
$\iota$ Cephei . . .	22	45	36.99	+	65	35	22	40	41.86	5	+0.15
$\alpha$ Pisc. Aust. . .	22	51	15.17	—	30	14	22	46	19.18	5	—0.01
$\alpha$ Urs. Maj. . .	22	56	29.66	+	117	37	22	51	32.54	5	—0.07
$\pi$ Cephei . . .	23	04	18.95	+	74	45	22	59	24.30	5	—0.42
$\tau$ Pegasi . . .	23	14	55.02	+	23	06	23	09	59.18	5	—0.12
$\delta$ Cassiopeiæ . .	23	19	44.51	+	61	39	23	14	49.56	5	+0.16
70 Pegasi . . .	23	23	18.35	+	12	07	23	17	22.62	5	+0.08
$\iota$ Andromedæ . .	23	32	28.77	+	42	38	23	27	33.24	5	+0.01
$\iota$ Piscium . . .	23	33	59.99	+	5	00	23	29	03.99	4	—0.16
$\omega^2$ Aquarii . . .	23	36	43.20	—	15	11	23	31	47.28	4	+0.03
41 II. Cephei . .	23	42	26.12	+	67	10	23	37	31.74	5	+0.70
$\phi$ Pegasi . . .	23	46	36.34	+	18	29	23	41	40.64	5	+0.18
$\omega$ Piscium . . .	23	53	22.21	+	6	13	23	48	26.40	5	+0.13
Adopted clock-rate —.044 sec. per hour.											

Normal equations:

$$\begin{aligned}
 0 &= +50.936da - 69.848dc - 0.720dt + 0.911 \\
 0 &= +13.841da' + 13.205dc + 2.150dt - 0.117 \\
 0 &= -69.848da + 13.205da' + 175.129dc + 5.770dt - 5.946 \\
 0 &= -0.720da + 2.150da' + 5.770dc + 29.000dt - 0.110
 \end{aligned}$$

Whence  $da = +.076$ ,  $da' = -.057$ ,  $dc = +.069$ ,  $dt = -.004$ , weight of  $dt = 28.544$   
on this night  $a = +200$ ,  $a' = +100$ ,  $c = +150$ ,  $t = 4$  m. 56.21 sec.  
Whence total azimuth before reversal  $= a + da = +.276$   
" " after "  $= a' + da' = +.043$   
" Collimation (Clamp West)  $= c + dc = +.219$   
Clock error  $= t + dt = 4$  m. 56.206 sec.  
and probable error  $= \pm .037$  sec.

TABLE II. — *Continued.*

OBSERVATIONS OF SEPTEMBER 6, 1883, TORONTO.

CLAMP EAST.													
Name of star.	$\alpha$ .			$\delta$ .	$T$ .			No. of wires.	$B$ .	$b$ .	Equations of condition.	Residuals.	
	h.	m.	s.	°	'	h.	m.	s.					
110 Herculis . .	18	40	40.57	+ 20	26	18	35	43.80	5	+0.98	-.28	$+0.42da + 1.07dc + dt - .09 = 0$	-.08
$\sigma$ Sagittarii . .	18	48	04.59	- 26	26	18	43	07.86	5	+0.38	-.28	$+1.05da + 1.12dc + dt + .06 = 0$	-.03
R. Lyræ . . .	18	51	49.13	+ 43	48	18	46	52.58	5	+1.38	-.28	$+0.00da + 1.38dc + dt - .02 = 0$	-.02
$\gamma$ Lyræ . . .	18	54	36.87	+ 32	32	18	49	40.20	5	+1.16	-.28	$+0.23da + 1.19dc + dt - .05 = 0$	-.04
$\zeta$ Aquilæ . . .	19	00	05.13	+ 13	42	18	55	08.50	4	+0.89	-.27	$+0.52da + 1.03dc + dt + .09 = 0$	+ .11
$\pi$ Sagittarii . .	19	02	52.23	- 21	12	18	57	55.44	5	+0.46	-.27	$+0.97da + 1.07dc + dt + .00 = 0$	+ .03
$\delta$ Draconis . .	19	12	33.84	+ 67	28	19	07	37.86	5	+2.39	-.27	$-1.05da + 2.61dc + dt + .14 = 0$	+ .13
$\tau$ Draconis . .	19	17	50.00	+ 73	09	19	12	54.03	4	+3.00	-.27	$-1.70da + 3.45dc + dt - .12 = 0$	-.15
$\iota$ Cygni . . .	19	26	48.25	+ 51	29	19	22	51.96	5	+1.59	-.27	$-0.22da + 1.60dc + dt + .20 = 0$	+ .20
$\theta$ Cygni . . .	19	33	21.20	+ 49	57	19	28	24.60	5	+1.55	-.26	$-0.17da + 1.55dc + dt - .07 = 0$	-.07
$\gamma$ Aquilæ . . .	19	40	45.29	+ 10	20	19	35	48.46	5	+0.85	-.26	$+0.56da + 1.02dc + dt - .07 = 0$	-.05
$\alpha$ Aquilæ . . .	19	45	08.00	+ 8	34	19	40	11.14	5	+0.83	-.26	$+0.58da + 1.01dc + dt - .10 = 0$	-.08
$\epsilon$ Draconis . .	19	48	36.86	+ 69	59	19	43	40.58	5	+2.62	-.26	$-1.29da + 2.92dc + dt - .20 = 0$	-.22
$\psi$ Cygni . . .	19	52	39.45	+ 52	08	19	47	43.15	4	+1.61	-.26	$-0.24da + 1.63dc + dt + .20 = 0$	+ .20
Br. 1147 . . .	20	04	50.50	+103	54	19	59	51.78	5	-2.07	-.26	$+3.66da - 4.16dc + dt - .26 = 0$	-.20
$\kappa$ Cephei . . .	20	12	52.37	+ 77	22	20	07	56.74	5	+3.80	-.26	$-2.53da + 4.57dc + dt - .09 = 0$	-.13
$\gamma$ Cygni . . .	20	18	05.25	+ 39	53	20	13	08.56	5	+1.30	-.26	$+0.09da + 1.30dc + dt - .04 = 0$	-.03
$\theta$ Cephei . . .	20	27	40.71	+ 62	37	20	22	44.38	5	+2.06	-.26	$-0.70da + 2.17dc + dt + .01 = 0$	.00
CLAMP WEST.													
$\gamma$ Aquarii . . .	22	15	40.78	- 1	58	22	10	43.18	5	+0.70	-.03	$+0.71da' - 1.00dc + dt - .09 = 0$	-.18
3 Lacertæ . . .	22	19	02.28	+ 51	39	22	14	05.28	5	+1.60	-.03	$-0.23da' - 1.61dc + dt + .49 = 0$	+ .49
7 Lacertæ . . .	22	26	33.01	+ 49	41	22	21	35.74	5	+1.54	-.03	$-0.16da' - 1.55dc + dt + .21 = 0$	+ .20
$\eta$ Aquarii . . .	22	29	24.65	- 0	43	22	24	27.18	5	+0.71	-.03	$+0.70da' - 1.00dc + dt + .05 = 0$	-.04
10 Lacertæ . . .	22	34	05.11	+ 38	27	22	29	07.80	5	+1.27	-.03	$+0.12da' - 1.28dc + dt + .18 = 0$	+ .15
$\eta$ Pegasi . . .	22	37	35.35	+ 29	37	22	32	38.00	5	+1.12	-.03	$+0.28da' - 1.15dc + dt + .15 = 0$	+ .10
$\lambda$ Pegasi . . .	22	40	57.93	+ 22	57	22	36	00.40	5	+1.02	-.03	$+0.38da' - 1.09dc + dt - .03 = 0$	-.09
$\iota$ Cephei . . .	22	45	36.99	+ 65	35	22	40	39.46	5	+2.24	-.03	$-0.90da' - 2.42dc + dt + .02 = 0$	+ .08
$\delta$ Aquarii . . .	22	48	30.44	- 16	16	22	43	33.04	5	+0.52	-.03	$+0.90da' - 1.04dc + dt + .17 = 0$	+ .06
$\alpha$ Pisc. Aust. .	22	51	15.18	- 30	14	22	46	17.55	3	+0.32	-.03	$+1.11da' - 1.16dc + dt + .00 = 0$	-.13
$\pi$ Cephei . . .	23	04	18.96	+ 74	46	22	59	21.17	4	+3.26	-.03	$-1.96da' - 3.81dc + dt - .11 = 0$	+ .05
Br. 3077 . . .	23	07	44.67	+ 56	32	23	02	47.17	4	+1.77	-.03	$-0.40da' - 1.81dc + dt + .04 = 0$	+ .05
4 Cassiopeæ . .	23	19	44.52	+ 61	39	23	14	46.67	3	+2.00	-.03	$-0.65da' - 2.10dc + dt - .28 = 0$	-.24
70 Pegasi . . .	23	23	18.35	+ 12	07	23	18	20.98	4	+0.87	-.03	$+0.53da' - 1.02dc + dt + .16 = 0$	+ .09
$\iota$ Andromedæ .	23	32	28.77	+ 42	37	23	27	31.16	5	+1.36	-.03	$+0.02da' - 1.36dc + dt - .09 = 0$	-.11
$\gamma$ Cephei . . .	23	34	43.03	+ 76	59	23	29	44.90	4	+3.71	-.03	$-2.44da' - 4.44dc + dt - .36 = 0$	-.16
Adopted clock-rate, -.040 sec. per hour.													

Normal equations:  $0 = +29.298da - 36.939dc + 0.180dt - 0.536$   
 $0 = +14.820da' + 18.095dc - 1.990dt + 1.355$   
 $0 = -36.939da + 18.095da' + 153.669dc - 1.380dt + 1.178$   
 $0 = + 0.180da - 1.990da' - 1.380dc + 31.000dt + 0.100$

Whence  $da = +.030$ ,  $da' = -.104$ ,  $dc = +.009$ ,  $dt = -.009$ , weight of  $dt = 33.712$   
on this night  $a = -.050$ ,  $a' = +.025$ ,  $c = -.200$ ,  $t = 4 \text{ m. } 57.24 \text{ sec.}$

Whence total azimuth before reversal  $= a + da = -.020$

" " after "  $= a' + da' = -.079$

" Collimation (Clamp East)  $= c + dc = -.191$

Clock error  $= t + dt = 4 \text{ m. } 57.231 \text{ sec.}$

and probable error  $= \pm .019 \text{ sec.}$

TABLE II.—Continued.

OBSERVATIONS OF SEPTEMBER 11, 1883, TORONTO.

CLAMP EAST.													
Name of star.	a.			δ.		T.			No. of wires.	B.	b.	Equations of condition.	Residuals.
	h.	m.	s.	°	'	h.	m.	s.					
110 Herculis . .	18	40	40.47	+ 20	26	18	35	38.20	5	+0.98	-.31	+0.42da +1.07dc +dt +.01=0	+0.06
σ Sagittarii . .	18	48	04.52	- 26	26	18	43	02.12	4	+0.38	-.31	+1.05da +1.12dc +dt +.03=0	+0.11
o Draconis . .	18	49	30.49	+ 59	15	18	44	28.58	3	+1.89	-.31	-0.52da +1.96dc +dt -.05=0	-.02
γ Lyrae . . .	18	54	36.77	+ 32	32	18	49	34.74	5	+1.16	-.32	+0.23da +1.19dc +dt +.18=0	+0.22
ξ Aquilæ . . .	19	00	05.05	+ 13	42	18	55	03.00	5	+0.89	-.32	+0.52da +1.03dc +dt +.28=0	+0.33
θ Lyrae . . .	19	12	21.21	+ 37	56	19	07	19.21	3	+1.26	-.33	+0.12da +1.27dc +dt +.17=0	+0.21
τ Draconis . .	19	17	49.64	+ 73	09	19	12	48.54	5	+3.00	-.33	-1.70da +3.45dc +dt +.15=0	+0.16
Gr. 1308 . . .	19	18	45.20	+111	17	19	13	41.11	2	-1.05	-.33	+2.55da -2.75dc +dt -.49=0	-.45
θ Cygni . . .	19	33	21.07	+ 49	57	19	28	19.16	5	+1.55	-.35	-0.17da +1.56dc +dt +.12=0	+0.15
ε Draconis . .	19	48	36.60	+ 69	59	19	43	35.14	4	+2.62	-.37	-1.29da +2.92dc +dt -.06=0	-.04
ψ Cygni . . .	19	52	39.32	+ 52	08	19	47	37.06	5	+1.61	-.38	-0.24da +1.63dc +dt -.28=0	-.25
Br. 1147 . . .	20	04	50.91	+103	54	19	59	46.04	5	-2.07	-.38	+3.66da -4.17dc +dt +.04=0	+0.10
γ Cygni . . .	20	18	05.17	+ 39	53	20	13	02.88	5	+1.30	-.39	+0.09da +1.30dc +dt -.13=0	-.09
θ Cephei . . .	20	27	40.56	+ 62	36	20	22	38.62	5	+2.06	-.39	-0.70da +2.17dc +dt -.21=0	-.19
73 Draconis . .	20	33	06.39	+ 74	34	20	28	05.12	5	+3.22	-.39	-1.93da +3.76dc +dt -.24=0	-.23
α Cygni . . .	20	37	30.18	+ 44	52	20	32	27.88	5	+1.41	-.39	-0.03da +1.41dc +dt -.18=0	-.15
ε Cygni . . .	20	41	32.26	+ 33	32	20	36	29.92	5	+1.18	-.39	+0.21da +1.20dc +dt -.09=0	-.05
CLAMP WEST.													
π <sup>2</sup> Cygni . . .	21	42	32.53	+ 48	47	21	37	29.64	4	+1.51	-.23	-0.13da' -1.52dc +dt -.06=0	-.11
Gr. 1586 . . .	21	47	53.25	+106	34	21	42	50.21	4	-1.60	-.23	+3.12da' +3.50dc +dt -.27=0	-.27
π Pegasi . . .	22	04	51.63	+ 32	37	21	59	48.82	5	+1.16	-.24	+0.23da' -1.19dc +dt +.06=0	+0.01
ζ Cephei . . .	22	06	52.54	+ 57	38	22	01	49.58	4	+1.81	-.24	-0.45da' -1.87dc +dt -.12=0	-.16
24 Cephei . . .	22	07	39.55	+ 71	46	22	02	36.64	2	+2.82	-.24	-1.51da' -3.20dc +dt -.11=0	-.16
θ Aquarii . . .	22	10	43.59	- 8	21	22	05	40.62	4	+0.62	-.24	+0.80da' -1.01dc +dt +.04=0	-.02
3 Lacertæ . . .	22	19	02.26	+ 51	39	22	13	59.34	5	+1.60	-.24	-0.23da' -1.61dc +dt -.07=0	-.11
9 H. Draconis .	22	25	04.62	+103	41	22	20	01.98	5	-2.11	-.25	+3.66da' +4.23dc +dt +.21=0	+0.21
η Aquarii . . .	22	29	24.65	- 0	43	22	24	21.74	5	+0.71	-.25	+0.70da' -1.00dc +dt +.09=0	+0.03
10 Lacertæ . . .	22	34	05.10	+ 38	27	22	29	02.26	5	+1.27	-.25	+0.12da' -1.28dc +dt +.06=0	+0.01
ι Cephei . . .	22	45	36.98	+ 65	36	22	40	34.62	5	+2.24	-.25	-0.90da' -2.42dc +dt +.49=0	+0.44
α Pisc. Aust. .	22	51	15.19	- 30	14	22	46	12.18	5	+0.32	-.25	+1.11da' -1.16dc +dt +.16=0	+0.09
α Pegasi . . .	22	59	00.10	+ 14	35	22	53	57.26	5	+0.91	-.25	+0.50da' -1.03dc +dt +.14=0	+0.09
π Cephei . . .	23	04	18.95	+ 74	46	22	58	16.16	5	+3.26	-.25	-1.96da' -3.81dc +dt +.07=0	+0.02
τ Pegasi . . .	23	14	55.05	+ 23	06	23	09	52.18	5	+1.02	-.24	+0.38da' -1.09dc +dt +.13=0	+0.08
Adopted clock-rate, -.075 sec. per hour.													

Normal equations:

$$\begin{aligned}
 0 &= +30.693da -39.443dc + 2.370dt - 0.383 \\
 0 &= +33.158da' +38.138dc + 5.440dt + 0.006 \\
 0 &= -39.443da +38.138da' +162.590dc + 5.660dt -1.451 \\
 0 &= + 2.370da + 5.440da' + 5.660dc +32.000dt +0.070
 \end{aligned}$$

 Whence  $da = +.050$ ,  $da' = -.032$ ,  $dc = +.029$ ,  $dt = -.005$ , weight of  $dt = 30.837$   
 on this night  $a = .000$ ,  $a' = .000$ ,  $c = -.180$ ,  $t = 5$  m. 02.91 sec.

 Whence total azimuth before reversal  $= a + da = +.050$   
 " " after "  $= a' + da' = -.032$   
 " Collimation (Clamp East)  $= c + dc = -.151$   
 Clock error  $= t + dt = 5$  m. 02.905 sec.  
 and probable error  $= \pm .025$  sec.

TABLE III.

THE DEDUCED CLOCK CORRECTIONS AND RATES ARE GIVEN IN THE FOLLOWING  
TABLE.

Place	Date.	Hour.	Clock corrections.		Hourly rate.
			m.	s.	
Montreal . . . . .	Aug. 25	21.0	-0	31.803	-.000
" . . . . .	" 30	21.0	-0	31.147	-.006
" . . . . .	" 31	21.0	-0	30.949	-.008
Toronto . . . . .	Sept. 5	21.0	+4	56.206	-.044
" . . . . .	" 6	21.0	+4	57.231	-.040
" . . . . .	" 11	21.0	+5	02.905	-.075

The clock corrections are in all cases given in sidereal time.

TABLE IV.

AZIMUTH AND COLLIMATION.

AT MONTREAL.				AT TORONTO.			
Date.	Position.	Total azimuth	Total collimation.	Date	Position.	Total azimuth.	Total collimation.
1883		s.	s.	1883		s.	s.
Aug. 25	L. E.	+0.457	-0.031	Sept. 5	C. W.	+0.276	+0.219
" 25	L. W.	+0.524		" 5	C. E.	+0.013	
" 30	L. W.	-0.425	+0.010	" 6	C. E.	-0.020	+0.191
" 30	L. E.	-0.754		" 6	C. W.	-0.079	
" 31	L. E.	+0.571	-0.024	" 11	C. E.	+0.050	+0.151
" 31	L. W.	+0.775		" 11	C. W.	-0.032	

The signs attached to the collimation are those which belong to L. W. and C. W.



TABLE V.

CLOCK COMPARISONS.

The chronograph sheets were read with a scale graduated to tenths of seconds, and each reading was estimated to hundredths of seconds. The omissions in the record of comparisons at Montreal occur at the time of coincidence of beats.

Readings of the Toronto clock on the Montreal chronograph corresponding to every fifteenth second of the Montreal clock.

Readings of the Montreal clock on the Toronto chronograph corresponding to every fifteenth second of the Toronto clock.

August 25, 1883. Beginning at 10h. 25m. 00s. M. C.			August 30, 1883. Beginning at 10h. 26m. 00s. M. C.			August 31, 1883. Beginning at 10h. 14m. 00s. M. C.		
h.	m.	s.	h.	m.	s.	h.	m.	s.
20	12	35.67	20	33	14.44	20	25	08.25
20	12	50.71	20	33	29.50	20	25	23.30
20	13	05.75	20	33	44.52	20	25	38.34
20	13	20.80	20	33	59.53	20	25	53.39
20	13	35.83	20	34	14.60	20	26	08.41
20	13	50.87	20	34	29.63	20	26	23.46
20	14	05.90	20	34	44.70	20	26	38.50
			20	34	59.70	20	26	53.54
			20	35	14.75	20	27	08.56
			20	35	29.80	20	27	23.61
			20	35	44.82	20	27	38.67
			20	35	59.85	20	27	53.70
20	15	51.23	20	36	14.91	20	28	08.75
20	16	06.26				20	28	23.80
20	16	21.26				20	28	38.83
20	16	36.33				20	28	53.85
20	16	51.37				20	29	08.90
20	17	06.42						
20	17	21.43	20	38	15.25			
20	17	36.50	20	38	30.30	20	31	09.23
20	17	51.50	20	38	45.33	20	31	24.30
20	18	06.56	20	39	00.40	20	31	39.33
20	18	21.60	20	39	15.43	20	31	54.37
20	18	36.67	20	39	30.45	20	32	09.40
20	18	51.71	20	39	45.50	20	32	24.45
20	19	06.73	20	40	00.55	20	32	39.48
20	19	21.80	20	40	15.60	20	32	54.52
20	19	36.80	20	40	30.62	20	33	09.55
20	19	51.87	20	40	45.68	20	33	24.61
			20	41	00.70	20	33	39.64
			20	41	15.75	20	33	54.68
			20	41	30.78	20	34	09.72
			20	41	45.80	20	34	24.76
			20	42	00.84	20	34	39.81
			20	42	15.90	20	34	54.85
						20	35	09.90
Means:								
20	15	33.161	20	37	30.128	20	30	09.073

September 5, 1883. Beginning at 21h. 27m. 00s. T. C.			September 6, 1883. Beginning at 21h. 47m. 00s. T. C.			September 11, 1883. Beginning at 21h. 14m. 15s. T. C.		
h.	m.	s.	h.	m.	s.	h.	m.	s.
10	56	06.36	11	12	07.91	10	19	52.00
10	56	21.34	11	12	22.90	10	20	06.90
10	56	36.28	11	12	37.85	10	20	21.90
10	56	51.27	11	12	52.80	10	20	36.87
10	57	06.18	11	13	07.77	10	20	51.82
10	57	21.18	11	13	22.73	10	21	06.80
10	57	36.10	11	13	37.70	10	21	21.78
10	57	51.09	11	13	52.68	10	21	36.70
10	58	06.00	11	14	07.60	10	21	51.67
10	58	21.00	11	14	22.54	10	22	06.60
10	58	36.00	11	14	37.54	10	22	21.56
10	58	50.92	11	14	52.52	10	22	36.50
10	59	05.85	11	15	07.43	10	22	51.51
10	59	20.83	11	15	22.38	10	23	06.46
10	59	35.82	11	15	37.38	10	23	21.39
10	59	50.76	11	15	52.33	10	23	36.37
11	00	05.70	11	16	07.26	10	23	51.33
11	00	20.70	11	16	22.21	10	24	06.30
11	00	35.64	11	16	37.22	10	24	21.24
11	00	50.63	11	16	52.20	10	24	36.20
11	01	05.56	11	17	07.10	10	24	51.17
11	01	20.54	11	17	22.06	10	25	06.11
11	01	35.48	11	17	37.04	10	25	21.06
11	01	50.47	11	17	52.00	10	25	36.00
11	02	05.35	11	18	06.95	10	25	51.00
11	02	20.36	11	18	21.90	10	26	05.95
11	02	35.30	11	18	36.87	10	26	20.94
11	02	50.29	11	18	51.82	10	26	35.86
11	03	05.22	11	19	06.77	10	26	50.85
11	03	20.18	11	19	21.72	10	27	05.80
11	03	35.15	11	19	36.72	10	27	20.74
11	03	50.10	11	19	51.65	10	27	35.75
11	04	05.05	11	20	06.62	10	27	50.66
11	04	20.00	11	20	21.57	10	28	05.63
11	04	35.00	11	20	36.58	10	28	20.58
11	04	49.95	11	20	51.49	10	28	35.59
11	05	04.89	11	21	06.45	10	28	50.47
11	05	19.89	11	21	21.40	10	29	05.47
11	05	34.85	11	21	36.40	10	29	20.43
11	05	49.78				10	29	35.40
11	06	04.72				10	29	50.30
11	06	19.72						
11	06	34.67						
11	06	49.63						
11	07	04.55						
11	07	19.54						
11	07	34.52						
Means:								
11	01	50.434	11	16	52.155	10	24	51.161



TABLE III.

OBSERVATIONS OF AUGUST 25, 1883, TORONTO.

Name of star.	$\delta$ .	$H_1 H_2$ .	Time of transit.			$\alpha$ .	$B b$ .	Equations of condition.				$H_1 H_2 v$ .
POSITION OF AXIS $\odot W$ .												
8 Lyncis . . .	+119	.53	h. m. s.	18 22 18.29	2.80	+0.08	.53T +1.074a	-1.114c	+0.079=0	+0.06		
$\alpha$ Lyrae . . .	+ 39	.96	18 28 16.37	1.46	-0.25	.96T +0.107a	+1.230c	-0.028=0	-0.04			
51 H. Cephei (4 wires) . . .	+ 92.8	.09	18 40 38.79	23.71	+3.16	.09T +1.425a	-1.886c	-1.107=0	-0.13			
$\pi$ Sagittarii . .	- 21	.90	18 57 7.18	52.37	-0.10	.90T +0.874a	+0.966c	-0.009=0	-0.03			
$\delta$ Draconis . .	+ 67	.71	19 7 49.36	34.35	-0.50	.71T -0.747a	+1.852c	+0.092=0	+0.10			
$\tau$ Draconis . .	+ 73	.58	19 13 5.25	50.68	-0.59	.58T -0.984a	+2.000c	-0.128=0	-0.12			
$\beta$ Cygni . . .	+ 28	.99	19 21 18.33	3.49	-0.20	.99T +0.307a	+1.119c	-0.050=0	-0.06			
$\theta$ Cygni . . .	+ 50	.91	19 28 36.23	21.45	-0.28	.91T -0.155a	+1.414c	-0.073=0	-0.08			
$\gamma$ Aquilæ . .	+ 10	.99	19 36 0.32	45.40	-0.16	.99T +0.561a	+1.021c	+0.059=0	+0.05			
$\alpha$ Aquilæ . .	+ 9	.99	19 40 22.93	8.11	-0.15	.99T +0.575a	+1.001c	-0.030=0	-0.04			
$\alpha^1$ Seq. Cygni .	+ 46	.93	20 4 15.32	0.41	-0.26	.93T -0.064a	+1.349c	+0.056=0	+0.05			
POSITION OF AXIS $\odot E$ .												
$\epsilon$ Pegasi . . .	+ 9	.99	21 33 45.52	30.29	-0.17	.99T +0.565a	-1.003c	-0.020=0	-0.03			
$\delta$ Capricorni .	- 17	.92	21 35 54.14	39.03	-0.14	.92T +1.149a	-1.323c	-0.019=0	-0.04			
16 Pegasi . . .	+ 25	.99	21 43 3.68	48.31	-0.21	.99T +0.344a	-1.096c	+0.069=0	+0.06			
$\alpha$ Aquarii . .	- 1	.98	21 55 5.56	50.40	-0.14	.98T +0.687a	-0.980c	-0.029=0	-0.04			
$\pi$ Pegasi . . .	+ 33	.98	22 0 6.96	51.61	-0.23	.98T +0.222a	-1.163c	+0.020=0	+0.02			
$\zeta$ Cephei . . .	+ 58	.84	22 2 8.33	52.58	-0.36	.84T -0.379a	-1.569c	+0.101=0	+0.11			
30 H. Urs. Maj.	+114	.52	22 10 54.55	40.56	+0.17	.52T +1.209a	+1.286c	-0.021=0	-0.04			
3 Lacertæ . .	+ 52	.90	22 14 17.71	2.25	-0.32	.90T -0.202a	-1.451c	+0.045=0	+0.04			
9 H. Draconis .	+104	.40	22 20 17.95	4.32	+0.43	.40T +1.463a	+1.689c	+0.120=0	+0.09			
10 Lacertæ . .	+ 38	.97	22 29 20.43	5.04	-0.27	.97T +0.113a	-1.239c	+0.029=0	+0.03			
$\eta$ Pegasi . . .	+ 30	.98	22 32 50.68	35.27	-0.24	.98T +0.273a	-1.127c	+0.108=0	+0.10			
$\alpha$ Pis. Australis	- 30	.80	22 46 30.11	15.06	-0.07	.80T +0.890a	-0.931c	-0.056=0	-0.07			
$\pi$ Cephei . . .	+ 75	.52	22 59 35.00	18.76	-0.81	.52T +1.021a	+1.978c	-0.151=0	-0.13			
Transit times reduced to 20 h. Assumed clock-rate, 0.046 sec. per hour.												

Normal equations :

$$\begin{aligned}
 16.979681dt + 5.834885da - 1.340526dc + 0.148373 &= 0 \\
 5.834885dt + 14.240756da - 2.811641dc + 0.228049 &= 0 \\
 1.340526dt + 2.811641da - 41.718449dc - 0.051437 &= 0
 \end{aligned}$$

Whence

$$\begin{aligned}
 dt &= -0.004 \quad dc = -0.002 \quad da = -0.015 \\
 \text{Assumed} \quad t &= +4 \ 45.100 \quad c = +0.230 \text{ for } \odot W \quad a = 0.000
 \end{aligned}$$

$\therefore$

$$t + dt = +4 \ 45.096 \quad c + dc = +0.228 \quad a + da = -0.015$$

and probable error of  $dt = \pm 0.014$ .

TABLE III. — *Continued.*  
OBSERVATIONS OF AUGUST 30, 1883, TORONTO.

Name of star.	$\delta$ .	$W_1 W_2$ .	Time of transit			$a$ .	$B b$ .	Equations of condition.	$W_1 W_2 c$ .
POSITION OF AXIS $\odot$ E.									
$\lambda$ Aquarii . .	$- 5$	.97	h	m.	s.	s.	s.	$.97dt + 0.731da - 0.974dc - .010 = 0$	$+ .08$
$\pi$ Sagittarii . .	$- 21$	.85	18	58	2.68	52.31	$- 0.11$	$.85dt + 0.824da - 0.911dc - .136 = 0$	$-.05$
$\delta$ Draconis . .	$+ 67$	.52	19	7	45.41	34.13	$- 0.62$	$.52dt - 0.515da - 1.352dc - .067 = 0$	$+ .03$
$\tau$ Draconis . .	$+ 73$	.55	19	13	1.82	50.38	$- 0.80$	$.55dt - 0.927da - 1.886dc - .197 = 0$	$- .06$
$\beta$ Cygni . . .	$+ 28$	.99	19	21	14.05	3.43	$- 0.30$	$.99dt + 0.307da - 1.119dc - .089 = 0$	$.00$
$\lambda$ Sagittarii . .	$- 25$	.86	19	24	49.73	39.32	$- 0.11$	$.86dt + 0.886da - 0.950dc - .095 = 0$	$.00$
$\theta$ Cygni . . .	$+ 50$	.91	19	28	32.07	21.35	$- 0.43$	$.91dt - 0.155da - 1.050dc - .200 = 0$	$- .12$
$\delta$ Cygni . . .	$+ 45$	.94	19	36	33.04	22.33	$- 0.41$	$.94dt - 0.027da - 1.325dc - .160 = 0$	$-.05$
$\alpha$ Aquarii . .	$+ 9$	.99	19	40	18.74	8.07	$- 0.24$	$.99dt + 0.575da - 1.001dc + .059 = 0$	$+ .15$
Br. 1147 . . .	$+ 104$	.40	19	59	58.57	50.03	$+ 0.57$	$.40dt + 1.462da + 1.666dc + .024 = 0$	$- .09$
$\sigma^1$ Seq. Cygni .	$+ 46$	.93	20	5	11.09	0.33	$- 0.39$	$.93dt - 0.064da - 1.349dc - .084 = 0$	$+ .02$
$\kappa$ Cephei . .	$+ 77$	.40	20	8	4.65	52.76	$- 1.00$	$.40dt - 1.006da - 1.814dc - .139 = 0$	$- .01$
POSITION OF AXIS $\odot$ W.									
$\beta$ Aquarii . .	$- 6$	.97	21	20	37.73	27.93	$- 0.05$	$.97dt + 0.744da + 0.976dc - .068 = 0$	$- .15$
$\gamma^4$ Cygni . . .	$+ 40$	.96	21	27	29.73	19.65	$- 0.11$	$.96dt + 0.082da + 1.251dc + .221 = 0$	$+ .09$
$\epsilon$ Pegasi . . .	$+ 9$	.99	21	33	40.26	30.30	$- 0.07$	$.99dt + 0.565da + 1.003dc + .089 = 0$	$.00$
$\delta$ Capricorni .	$- 17$	.92	21	35	49.00	39.04	$- 0.06$	$.92dt + 1.149da + 1.323dc + .175 = 0$	$+ .07$
Gr. 1586 . . .	$+ 107$	.42	21	43	3.22	52.89	$+ 0.14$	$.42dt + 1.324da - 1.489dc - .140 = 0$	$+ .02$
$\alpha$ Aquarii . .	$- 1$	.98	21	55	0.36	50.41	$- 0.06$	$.98dt + 0.687da + 0.980dc + .098 = 0$	$+ .01$
$\pi$ Pegasi . . .	$+ 33$	.98	22	0	1.60	51.62	$- 0.10$	$.98dt + 0.222da + 1.163dc + .127 = 0$	$+ .01$
$24$ Cephei . . .	$+ 72$	.60	22	2	49.54	39.67	$- 0.25$	$.60dt + 0.904da + 1.918dc + .192 = 0$	$- .01$
$30$ H. Urs. Maj. .	$+ 114$	.52	22	10	50.73	40.62	$+ 0.07$	$.52dt + 1.210da - 1.286dc - .192 = 0$	$- .05$
$7$ Lacertæ . .	$+ 50$	.91	22	21	42.87	32.98	$- 0.15$	$.91dt - 0.147da + 1.407dc + .082 = 0$	$- .06$
$10$ Lacertæ . .	$+ 38$	.97	22	29	15.04	5.07	$- 0.10$	$.97dt + 0.113da + 1.239dc + .155 = 0$	$+ .03$
$\eta$ Pegasi . . .	$+ 30$	.98	22	33	45.39	35.30	$- 0.08$	$.98dt + 0.273da + 1.127dc + .274 = 0$	$+ .16$
$\lambda$ Pegasi . . .	$+ 23$	.99	22	36	7.65	57.87	$- 0.07$	$.99dt + 0.380da + 1.075dc - .030 = 0$	$- .13$
Assumed clock-rate, 0.046 sec. per hour, losing.									

Normal equations :

$$\begin{aligned} 17.9588dt &+ 6.77792da &+ 1.07552dc &+ 0.19975 &= 0 \\ 6.77792dt &+ 13.766129da &+ 3.042108dc &+ 0.029835 &= 0 \\ 1.07552dt &+ 3.042108da &+ 42.141289dc &+ 3.736221 &= 0 \end{aligned}$$

Whence	$dt = -0$	$0.015$	$da = +0.025$	$dc = -0.090$
Assumed	$t = +4$	$49.900$	$a = 0.000$	$c = +0.237$
$\therefore$	$t + dt = +4$	$49.885$	$a + da = +0.025$	$c + dc = +0.147$

and probable error of  $dt = \pm 0.014$ .

TABLE III. — *Continued.*

OBSERVATIONS OF AUGUST 31, 1883, TORONTO.

Name of star.	$\delta$ .	$W$ .	Time of transit.			$a$ .	$Bb$ .	Equations of condition.	$Wv$ .
POSITION OF AXIS $\odot$ E.									
$\pi$ Sagittarii . .	$-21$	.90	h. m. s.	s.	s.	s.	s.	$.90dt + 0.874da - 0.966dc - .072 = 0$	$-.10$
$\delta$ Draconis . .	$+67$	.71	19 7 44.07	34.08	-0.63	.71dt - 0.747da - 1.852dc - .170 = 0	-11		
Gr. 1308 . . .	$+111$	.49	19 13 52.50	44.56	$+0.30$	.49dt + 1.247da + 1.349dc + .000 = 0	-15		
$\beta$ Cygni . . .	$+28$	.99	19 21 13.00	3.41	-0.33	.99dt + 0.307da - 1.119dc + .040 = 0	$+0.01$		
$\lambda$ Sagittarii . .	$-25$	.86	19 24 48.85	39.31	-0.13	.86dt + 0.886da - 0.950dc + .163 = 0	$+0.14$		
$\theta$ Cygni . . .	$+50$	.91	19 28 31.25	21.32	-0.51	.91dt - 0.155da - 1.414dc + .101 = 0	$+0.10$		
$\delta$ Cygni . . .	$+45$	.94	19 36 31.99	22.31	-0.49	.94dt - 0.027da - 1.325dc - .085 = 0	$-.09$		
$\alpha$ Aquilæ . . .	$+9$	.99	19 40 17.51	8.05	-0.29	.99dt + 0.576da - 1.001dc - .010 = 0	$-.05$		
$\epsilon$ Draconis . . .	$+70$	.65	19 43 47.54	37.10	-0.92	.65dt - 0.841da - 1.897dc - .084 = 0	$-.02$		
$\psi$ Cygni . . .	$+52$	.90	19 47 49.42	39.57	-0.57	.90dt - 0.216da - 1.466dc - .036 = 0	$-.03$		
$\theta$ Aquilæ . . .	$-1$	.98	20 0 29.27	19.80	-0.25	.98dt + 0.693da - 0.980dc + .070 = 0	$+0.03$		
$\sigma^1$ Seq. Cygni .	$+46$	.93	20 5 10.14	0.31	-0.49	.93dt - 0.064da - 1.349dc + .065 = 0	$+0.06$		
$\gamma$ Cygni . . .	$+40$	.96	20 13 15.00	5.31	-0.41	.96dt + 0.083da - 1.251dc + .058 = 0	$+0.04$		
POSITION OF AXIS $\odot$ W.									
$\sigma^2$ Urs. Maj. . .	$+112$	.50	20 55 14.80	5.85	$+0.11$	.50dt + 1.223da - 1.312dc - .195 = 0	$-.16$		
Br. 2777 . . .	$+78$	.43	21 3 3.58	55.20	-0.47	.43dt - 1.124da + 2.011dc + .047 = 0	$-.14$		
$\alpha$ Cephei . . .	$+62$	.74	21 11 0.51	51.71	-0.25	.74dt - 0.500da + 1.581dc + .133 = 0	$-.06$		
$\zeta$ Capricorni . .	$-23$	.88	21 15 12.19	3.36	-0.05	.88dt + 0.876da + 0.956dc + .158 = 0	$-.01$		
$\beta$ Cephei . . .	$+70$	.65	21 22 22.76	14.15	-0.32	.65dt - 0.847da + 1.905dc + .071 = 0	$-.14$		
74 Cygni . . .	$+40$	.96	21 27 28.56	19.64	-0.16	.96dt + 0.082da + 1.251dc + .211 = 0	$+0.02$		
$\epsilon$ Pegasi . . .	$+9$	.99	21 33 39.12	30.29	-0.10	.99dt + 0.565da + 1.003dc + .129 = 0	$-.05$		
Gr. 1586 . . .	$+107$	.45	21 43 2.17	52.92	$+0.18$	.45dt + 1.404da - 1.588dc - .081 = 0	$-.02$		
6 Aquarii . . .	$-14$	.94	21 55 19.94	11.08	-0.06	.94dt + 0.823da + 0.971dc + .207 = 0	$+0.03$		
$\theta$ Pegasi . . .	$+6$	.99	21 59 30.80	21.85	-0.08	.99dt + 0.613da + 0.995dc + .287 = 0	$+0.11$		
$\zeta$ Cephei . . .	$+58$	.84	22 2 1.54	52.58	-0.19	.84dt - 0.379da + 1.569dc + .319 = 0	$+0.11$		
3 Lacertæ . . .	$+52$	.90	22 14 11.24	2.26	-0.14	.90dt - 0.202da + 1.451dc + .360 = 0	$+0.16$		
7 Lacertæ . . .	$+50$	.91	22 21 41.79	32.98	-0.13	.91dt - 0.147da + 1.407dc + .218 = 0	$+0.02$		
Assumed clock-rate, 0.046 sec. per hour.									

Normal equations :

$$\begin{aligned}
 18.4361dt + 4.29015da - 2.20018dc + 1.86331 &= 0 \\
 4.29015dt + 13.408047da - 4.747413dc + 0.14677 &= 0 \\
 2.20018dt + 4.747413da - 49.567929dc - 3.332952 &= 0
 \end{aligned}$$

Whence	$m.$ $dt = -0 \quad 0.109$	$s.$ $da = -0.002$	$dc = -0.072$
Assumed	$t = +4 \quad 51.100$	$a = 0.000$	$c = +0.239$
$\therefore$	$t + dt = +4 \quad 50.991$	$a + da = -0.002$	$c + dc = +0.167$
and probable error of	$dt = \pm 0.016.$		

TABLE III. — *Continued.*

OBSERVATIONS OF SEPTEMBER 5, 1883, MONTREAL.

Name of star.	$\delta$ .	$H$ .	Time of transit.			$a$ .	$Bb$ .	Equations of condition.	$H'v$ .
POSITION OF AXIS. LAMP W.									
$\gamma$ Aquilæ . . .	+ 10	.99	h.	m.	s.	s.	s.		s.
$\psi$ Cygni . . .	+ 52	.89	8	41	37.832	45.289	+0.285	.99dt +0.580da +1.006dc -.085 = 0	-.01
Br. 1147 . . .	+104	.40	8	53	32.577	39.450	+0.555	.89dt -0.168da +1.450dc -.005 = 0	-.02
$\alpha^1$ Seq. Cygni . .	+ 46	.93	9	5	40.759	50.486	-0.749	.40dt +1.418da -1.666dc -.172 = 0	-.02
$\kappa$ Cephei . . .	+ 77	.47	9	10	53.314	0.222	+0.497	.93dt -0.021da +1.349dc +.061 = 0	+0.06
$\theta$ Cephei . . .	+ 63	.79	9	13	47.472	52.351	+1.332	.47dt -1.135da +2.149dc +.253 = 0	+0.14
73 Draconis . . .	+ 75	.53	9	28	34.170	40.707	+0.713	.79dt -0.505da +1.717dc +.029 = 0	-.02
			9	34	0.852	6.666	+1.126	.53dt -0.967da +1.991dc -.006 = 0	-.11
POSITION OF AXIS. LAMP E.									
$\alpha$ Urs. Maj. . . .	+118	.55	11	57	21.049	29.697	-0.308	.55dt +1.129da +1.186dc -.222 = 0	-.07
$\alpha$ Pegasi . . . .	+ 14	.99	11	59	52.598	60.053	+0.414	.99dt +0.526da -1.023dc -.015 = 0	+0.02
$c_2$ Aquarii . . . .	- 22	.86	12	4	8.738	16.488	+0.195	.86dt +0.855da -0.926dc -.052 = 0	+0.03
$\gamma$ Piscium . . . .	+ 3	.98	12	12	2.481	10.024	+0.349	.98dt +0.677da -0.981dc -.013 = 0	+0.04
$\delta$ Cassiopeiæ . . .	+ 62	.80	12	15	37.704	44.481	+0.965	.80dt -0.468da -1.685dc +.082 = 0	-.01
$\lambda$ Draconis . . . .	+110	.50	12	25	15.810	25.130	-0.608	.50dt +1.318da +1.460dc -.396 = 0	-.21
72 Pegasi . . . .	+ 31	.98	12	29	6.047	13.336	+0.546	.98dt +0.291da -1.140dc +.053 = 0	+0.05
$\iota$ Andromedæ . . .	+ 43	.95	12	33	21.493	28.741	+0.664	.95dt +0.065da -1.291dc -.015 = 0	-.04
$\gamma$ Cephei . . . .	+ 77	.47	12	35	36.793	42.940	+1.859	.47dt -1.089da -2.087dc -.050 = 0	-.23
$\delta$ Sculptoris . . .	- 29	.78	12	43	45.918	53.689	+0.153	.78dt +0.856da -0.890dc -.016 = 0	+0.07
$\phi$ Pegasi . . . .	+ 18	.99	12	47	28.904	36.331	+0.470	.99dt +0.474da -1.044dc +.022 = 0	+0.05
$\omega$ Piscium . . . .	+ 6	.99	12	54	14.671	22.199	+0.392	.99dt +0.631da -0.996dc +.001 = 0	+0.05
NOTE.—The times entered as the times of transit are the readings of a mean-time clock, with a correction applied at the assumed rate of 3m. 57.0s. per day, on sidereal time, to reduce to the error at 11h. of the clock.									

Normal equations :

$$\begin{aligned} 12.448dt &+ 3.93942da &- 2.47825dc &- 0.26436 = 0 \\ 3.93942dt &+ 12.167907da &- 5.242719dc &- 1.395337 = 0 \\ 2.47825dt &+ 5.242719da &- 38.679953dc &- 0.007824 = 0 \end{aligned}$$

Whence  $-dt = -00\ 00\ 0.016$   $da = +0.127$   $dc = +0.016$   
Assumed  $t = -10\ 59\ 6.500$   $a = +1.000$   $c = 0.000$   
 $\therefore t + dt = -10\ 59\ 6.484$   $a + da = +1.127$   $c + dc = +0.016$   
and probable error of  $dt = \pm 0.020.$

TABLE III.— *Continued.*

OBSERVATIONS OF SEPTEMBER 6, 1883, MONTREAL.

Name of star.	$\delta$ .	$H$ .	Time of transit.	$\alpha$ .	$Bb$ .	Equations of condition.	$H'v$ .
POSITION OF AXIS. LAMP W.							
$\epsilon$ Draconis . .	+ 70	.66	h. m. s. 8 45 34.545	s. 36.816	s. +0.096	$.66dt - 0.799da + 1.928dc - .056 = 0$	s. +.06
$\psi$ Cygni . . .	+ 52	.90	8 49 36.117	39.427	+0.055	$.90dt - 0.169da + 1.466dc - .129 = 0$	-.09
$\gamma$ Cygni . . .	+ 40	.96	9 15 1.758	5.231	+0.022	$.96dt + 0.122da + 1.251dc - .023 = 0$	-.02
$\beta$ Delphini . .	+ 14	.99	9 29 3.671	7.406	+0.005	$.99dt + 0.531da + 1.021dc + .105 = 0$	+.06
$\alpha$ Cygni . . .	+ 45	.94	9 34 26.874	30.240	+0.000	$.94dt + 0.015da + 1.326dc - .047 = 0$	-.03
$\eta$ Cephei . . .	+ 61	.82	9 39 55.505	58.387	-0.014	$.82dt - 0.469da + 1.713dc - .138 = 0$	-.06
$\beta$ Vulpeculæ .	+ 28	.99	9 46 34.522	38.117	-0.016	$.99dt + 0.344da + 1.118dc + .036 = 0$	+.01
$\nu$ Cygni . . .	+ 41	.96	9 49 49.091	52.428	-0.026	$.96dt + 0.106da + 1.267dc + .045 = 0$	+.05
$\sigma^2$ Urs. Maj.	+112	.52	9 57 00.569	6.082	+0.032	$.52dt + 1.255da - 1.365dc + .121 = 0$	-.05
$\nu$ Aquarii . .	- 12	.96	10 0 13.165	17.204	-0.021	$.96dt + 0.826da + 0.981dc + .096 = 0$	+.02
POSITION OF AXIS. LAMP E.							
$\alpha$ Pegasi . . .	+ 14	.99	11 55 56.371	60.065	+0.026	$.99dt + 0.526da - 1.023dc + .161 = 0$	+.06
$\gamma$ Piscium . .	+ 3	.98	12 8 6.261	10.031	+0.024	$.98dt + 0.667da - 0.981dc + .220 = 0$	+.12
$\tau$ Pegasi . . .	+ 23	.99	12 11 51.337	55.004	+0.033	$.99dt + 0.411da - 1.076dc + .079 = 0$	-.01
$\delta$ Cassiopeiæ .	+ 62	.80	12 16 41.581	44.492	+0.069	$.80dt - 0.468da - 1.685dc - .102 = 0$	-.12
$\lambda$ Draconis . .	+110	.50	12 21 19.367	25.130	-0.043	$.50dt + 1.318da + 1.460dc + .065 = 0$	-.04
$\iota$ Andromedæ .	+ 43	.95	12 29 25.350	28.752	+0.046	$.95dt + 0.065da - 1.291dc + .011 = 0$	-.05
$\gamma$ Cephei . . .	+ 77	.47	12 31 41.777	42.963	+0.129	$.47dt - 1.089da - 2.087dc - .035 = 0$	+.01
41 H. Cephei .	+ 67	.71	12 39 23.822	26.096	+0.079	$.71dt - 0.675da - 1.829dc + .109 = 0$	+.11
$\rho$ Cassiopeiæ .	+ 57	.87	12 45 35.126	38.142	+0.053	$.87dt - 0.313da - 1.591dc - .020 = 0$	-.05
$\omega$ Piscium . .	+ 6	.98	12 50 18.328	22.211	+0.021	$.98dt + 0.624da - 0.986dc + .074 = 0$	-.03
NOTE.— The times entered as the times of transit are the readings of a mean-time clock, with a correction applied at the assumed rate of 3m. 57.0s. per day, on sidereal time, to reduce to the error at 11h. of the clock.							

Normal equations :

$$\begin{aligned} 14.9524dt + 2.75654da + 0.49606dc + 0.5458 &= 0 \\ 2.75654dt + 8.550616da + 2.123486dc + 0.853478 &= 0 \\ 0.49606dt + 2.123486da + 39.855685dc - 0.881320 &= 0 \end{aligned}$$

Whence	h. m. s.			
	$dt = -00\ 0\ 0.019$	$da = -0.101$	$dc = +0.028$	
Assumed	$t = +11\ 3\ 3.300$	$a = +1.000$	$c = 0.000$	
$\therefore$	$t + dt = +11\ 3\ 3.281$	$a + da = +0.899$	$c + dc = +0.028$	
and probable error of	$dt = \pm 0.012.$			

TABLE III. — *Continued.*

OBSERVATIONS OF SEPTEMBER 11, 1883, MONTREAL.

Name of star.	$\delta$ .	$W$ .	Time of transit.			$a$ .	$Bb$ .	Equations of condition.			$W'v$ .	
POSITION OF AXIS. LAMP W.												
	$^{\circ}$		h.	m.	s.	s.	s.				s.	
$\beta$ Cygni . . .	+ 28	.98	8	3	14.425	3.234	+0.109	.98dt	+0.338da	+1.106dc	-.053=0	+0.04
$\theta$ Cygni . . .	+ 50	.91	8	10	32.567	21.041	+0.153	.91dt	-0.110da	+1.414dc	-.129=0	+0.01
$\gamma$ Aquilæ . . .	+ 10	.99	8	17	56.117	55.206	+0.081	.99dt	+0.580da	+1.006dc	-.121=0	-.04
Gr. 1374 . . .	+106	.44	8	23	22.180	12.893	-0.177	.44dt	+1.405da	-1.618dc	+265=0	+12
$\epsilon$ Draconis . . .	+ 70	.66	8	25	48.978	36.551	+0.255	.66dt	-0.799da	+1.928dc	-.150=0	+0.05
Br. 1147 . . .	+104	.40	8	41	59.615	50.982	-0.201	.40dt	+1.418da	-1.666dc	+111=0	-.04
$\sigma$ Seq. Cygni . . .	+ 46	.94	8	47	11.525	0.101	+0.132	.94dt	-0.022da	+1.363dc	-.157=0	-.02
$\alpha^2$ Capricorni . . .	- 13	.91	8	48	48.334	37.589	+0.048	.94dt	+0.822da	+0.964dc	-.031=0	+0.02
$\kappa$ Cephei . . .	+ 77	.47	8	50	5.181	51.886	+0.346	.47dt	-1.135da	+2.149dc	-.222=0	.00
$\theta$ Cephei . . .	+ 63	.79	9	4	52.446	40.520	+0.181	.79dt	-0.505da	+1.717dc	-.183=0	-.01
73 Draconis . . .	+ 75	.53	9	10	19.152	6.326	+0.282	.53dt	-0.966da	+1.991dc	-.220=0	-.02
$\alpha$ Delphini . . .	- 16	.99	9	11	26.817	15.809	+0.077	.99dt	+0.514da	+1.028dc	-.095=0	-.01
$\alpha$ Cygni . . .	+ 45	.94	9	14	41.539	30.154	+0.120	.94dt	+0.015da	+1.326dc	-.168=0	-.04
$\epsilon$ Aquarii . . .	- 10	.95	9	18	35.222	24.388	+0.049	.95dt	+0.794da	+0.964dc	+018=0	+0.07
32 Vulpeculæ . . .	+ 28	.99	9	26	49.216	38.059	+0.087	.99dt	+0.344da	+1.118dc	-.108=0	-.01
$\nu$ Aquarii . . .	- 12	.94	9	40	27.959	17.166	+0.042	.94dt	+0.808da	+0.960dc	-.005=0	+0.05
POSITION OF AXIS. LAMP E.												
7 Lacertæ . . .	+ 50	.91	11	3	44.722	32.969	+0.187	.91dt	-0.102da	-1.407dc	+116=0	+12
$\zeta$ Pegasi . . .	+ 10	.99	11	12	52.654	41.644	+0.100	.99dt	+0.582da	-1.006dc	-.003=0	-.03
$\lambda$ Pegasi . . .	+ 23	.99	11	18	8.926	57.910	+0.120	.99dt	+0.412da	-1.075dc	-.147=0	-.16
6 Cephei . . .	+ 66	.75	11	22	49.038	36.935	+0.270	.75dt	-0.623da	-1.815dc	-.118=0	+11
$\delta$ Aquarii . . .	- 16	.91	11	25	41.236	30.438	+0.058	.91dt	+0.837da	-0.949dc	+069=0	+0.02
$\alpha$ Urs. Maj. . . .	+118	.55	11	33	39.613	29.755	-0.079	.55dt	+1.129da	+1.186dc	+066=0	+0.08
$\beta$ Pegasi . . .	+ 27	.99	11	35	21.607	10.438	+0.126	.99dt	+0.346da	-1.116dc	-.055=0	-.07
$\pi$ Cephei . . .	+ 75	.53	11	41	32.109	18.893	+0.392	.53dt	-0.985da	-2.017dc	+026=0	+0.03
Br. 3077 . . .	+ 57	.85	11	44	56.433	44.648	+0.208	.85dt	-0.295da	-1.541dc	-.046=0	-.04
$\tau$ Pegasi . . .	+ 23	.99	11	52	6.152	55.027	+0.118	.99dt	+0.410da	-1.076dc	-.043=0	-.06
4 Cassiopeiæ . . .	+ 62	.80	11	56	56.629	44.513	+0.237	.80dt	-0.468da	-1.685dc	+053=0	+0.06
$\gamma$ Cephei . . .	+ 77	.47	12	11	56.932	43.018	+0.435	.47dt	-1.089da	-2.087dc	+156=0	+16

NOTE. — The times entered as the times of transit are the readings of a mean-time clock, with a correction applied at the assumed rate of 3m. 57.0s. per day, on sidereal time, to reduce to the error at 11h. of the clock.

NOTE. — The times entered as the times of transit are the readings of a mean-time clock, with a correction applied at the assumed rate of 3m. 57.0s. per day, on sidereal time, to reduce to the error at 11h. of the clock.

$$\begin{aligned}
 \text{Normal equations:} \quad & 19.3867dt + 4.04438da + 2.26804dc - 1.15481 = 0 \\
 & 4.04438dt + 15.536747da - 1.901581dc + 0.920547 = 0 \\
 & 2.26804dt - 1.901581da + 59.368376dc - 3.231439 = 0
 \end{aligned}$$

$$\begin{aligned}
 \text{Whence} \quad & dt = +00 \ 0 \ 0.069 \quad da = -0.071 \quad dc = +0.049 \\
 \text{Assumed} \quad & t = +11 \ 22 \ 48.300 \quad a = +1.000 \quad c = 0.000 \\
 \therefore \quad & t + dt = +11 \ 22 \ 48.369 \quad a + da = +0.929 \quad c + dc = +0.049 \\
 & \text{and probable error of} \quad dt = \pm 0.012.
 \end{aligned}$$



TABLE IV.

OBSERVATIONS FOR PERSONAL EQUATION, SEPTEMBER 15, 1883, TORONTO.

☉ W.

C. McLEOD.

Name of star.	$\delta$ .	Time of transit.			$a$ .	$Bb$ .	$Cc$ .	Equations of condition.	$v$ .
	$^{\circ}$	h.	m.	s.	s.	s.	s.		s.
73 Draconis . . .	+ 74	20	27	55.082	6 085	+0.077	+0.984	$dt - 1.927da - .642 = 0$	+0.02
$\epsilon$ Aquarii . . .	- 8	20	36	14.964	24.347	+0.006	+0.266	$dt + 0.817da + .189 = 0$	+0.15
$\eta$ Cephei . . .	+ 61	20	37	47.800	58.131	+0.016	+0.547	$dt - 0.635da - .468 = 0$	-0.13
$\nu$ Cygni . . .	+ 41	20	47	42.548	52.296	-0.009	+0.351	$dt + 0.068da - .088 = 0$	+0.07
$\alpha$ Cephei . . .	+ 62	21	10	41.070	51.410	-0.008	+0.560	$dt - 0.676da - .488 = 0$	-0.14
$\beta$ Cephei . . .	+ 70	21	22	3.076	13.744	-0.045	+0.768	$dt - 1.303da - .645 = 0$	-0.14
$\delta$ Capricorni . . .	- 17	21	35	29.604	38.989	-0.014	+0.377	$dt + 1.249da + .178 = 0$	+0.03
$\pi^2$ Cygni . . .	+ 49	21	37	22.614	32.459	-0.026	+0.397	$dt - 0.135da - .174 = 0$	+0.03
Gr. 1586 . . .	+107	21	42	45.670	53.476	+0.016	-0.919	$dt + 3.121da + .601 = 0$	-0.03
$\pi$ Pegasi . . .	+ 33	21	59	41.930	51.579	-0.031	+0.311	$dt + 0.227da - .065 = 0$	+0.05
7 Lacertæ . . .	+ 50	22	21	23.300	32.949	-0.100	+0.405	$dt - 0.162da - .044 = 0$	+0.17
$\lambda$ Pegasi . . .	+ 23	22	35	48.470	57.910	-0.072	+0.285	$dt + 0.384da + .073 = 0$	+0.14
$\alpha$ Urs. Maj. . .	+118	22	51	21.200	29.803	+0.027	-0.565	$dt + 2.073da + .159 = 0$	-0.20

$$\begin{aligned} \text{Normal equations:} \quad & 13.000dt + 3.101da - 1.414 = 0 \\ & 3.101dt + 22.784877da + 5.324611 = 0 \end{aligned}$$

$$\begin{aligned} & \text{m. s.} \\ \text{Whence} \quad & dt = +0 \quad 0.170 \quad da = -0.257 \\ \text{Assumed} \quad & t = +5 \quad 9.300 \quad a = 0.000 \quad \text{measured} \quad c + 0.262 \\ \therefore \quad & t + dt = +5 \quad 9.470 \quad a + da = -0.257 \\ & \text{and probable error of} \quad dt = \pm 0.024. \end{aligned}$$

☉ W.

C. CARPMAEL.

Name of star.	$\delta$ .	Time of transit.			$a$ .	$Bb$ .	$Cc$ .	Equations of condition.	$W$ .	$W r$ .
	$^{\circ}$	h.	m.	s.	s.	s.	s.		s.	s.
$\theta$ Cephei . . .	+ 63	20	22	30.180	40.388	+0.082	+0.569	$.78dt - 0.550da - .216 = 0$	.78	.02
$\alpha$ Cygni . . .	+ 45	20	32	20.430	30.082	+0.020	+0.370	$.94dt - 0.028da + .077 = 0$	.94	.05
$\sigma^2$ Ursæ . . .	+112	20	54	58.630	6.471	+0.011	-0.688	$.50dt + 1.223da + .381 = 0$	.50	.01
$\nu$ Aquarii . . .	- 12	20	58	7.780	17.134	-0.007	+0.268	$.95dt + 0.800da + .178 = 0$	.95	.06
Br. 2777 . . .	+ 78	21	2	42.450	54.369	-0.430	+1.225	$.43dt - 1.124da - .627 = 0$	.43	.25
74 Cygni . . .	+ 40	21	27	9.910	19.517	+0.029	+0.341	$.97dt + 0.082da + .042 = 0$	.97	.03
$\iota$ Aquarii . . .	- 14	21	55	1.780	11.073	-0.005	+0.271	$.94dt + 0.823da + .238 = 0$	.94	.01
23 Cephei . . .	+ 62	21	56	29.950	32.045	-0.031	+0.562	$.80dt - 0.546da - .227 = 0$	.80	.03
$\zeta$ Cephei . . .	+ 58	22	1	42.630	52.459	-0.047	+0.489	$.84dt - 0.379da - .090 = 0$	.84	.05
30 H. Ursæ . . .	+114	22	10	32.820	40.946	+0.040	-0.648	$.52dt + 1.210da + .284 = 0$	.52	.10
3 Lacertæ . . .	+ 52	22	13	52.470	62.202	-0.082	+0.422	$.90dt - 0.202da - .101 = 0$	.90	.02
$\eta$ Pegasi . . .	+ 30	22	32	25.920	35.322	-0.079	+0.301	$.98dt + 0.274da + .098 = 0$	.98	.03
$\iota$ Cephei . . .	+ 66	22	40	27.100	36.911	-0.158	+0.634	$.73dt - 0.661da - .040 = 0$	.73	.19

$$\begin{aligned} \text{Normal equations:} \quad & 8.5732dt + 0.76425da + 0.06837 = 0 \\ & 0.76425dt + 6.8451da + 2.206139 = 0 \end{aligned}$$

$$\begin{aligned} & \text{m. s.} \\ \text{Whence} \quad & dt = +0 \quad 0.021 \quad da = -0.325 \\ \text{Assumed} \quad & t = +5 \quad 9.280 \quad a = 0.000 \quad \text{C. measured} = + 0.262 \odot \text{ W.} \\ \therefore \quad & t + dt = +5 \quad 9.301 \quad a + da = -0.325 \\ & \text{and probable error of} \quad dt = \pm 0.024. \end{aligned}$$

$$\begin{aligned} & \text{m. s.} \\ \text{C. Carpmæl} \quad & t + dt = 5 \quad 9.301 \pm .024 \\ \text{C. McLeod} \quad & t + dt = 5 \quad 9.470 \pm .024 \\ \text{Personal equation (M. - C.)} \quad & = 0 \quad 0.169 \pm .034 \end{aligned}$$



TABLE V.—*Continued.*

## CLOCK COMPARISONS.

AUGUST 30.

The result given below is the mean thirty readings of the Toronto clock on the Montreal chronograph corresponding to every fifteenth second of the Montreal clock, beginning at 10h. 26m. 0s. of the Montreal clock. (See Table V., Part II.)

## MONTREAL CHRONOGRAPH.

Toronto clock.	Error.	Toronto sidereal time.	Montreal clock.	Equivalent sidereal time.	Error.	Montreal sidereal time.	Difference. Mont—Toronto.
h. m. s.	m. s.	h. m. s.	h. m. s.	h. m. s.	s.	h. m. s.	m. s.
20 37 30.128	—4 49.914	20 42 20.042	10 30 15.000	21 6 7.544	+31.146	21 5 36.398	23 16.356

AUGUST 31.

The results given below are each the mean of twelve readings of every fifth second of the Montreal clock as recorded on the Toronto chronograph, and the corresponding time of the Toronto clock.

## TORONTO CHRONOGRAPH.

Toronto clock.	Error.	Toronto sidereal time.	Montreal clock.	Equivalent sidereal time.	Error.	Montreal sidereal time.	Differences. Mont—Toronto.
h. m. s.	m. s.	h. m. s.	h. m. s.	h. m. s.	s.	h. m. s.	m. s.
20 38 29.057	—4 51.021	20 43 20.078	10 27 18.500	21 7 7.111	+30.948	21 6 36.163	23 16.085
20 39 29.228	—4 51.021	20 44 20.249	10 28 18.500	21 8 7.275	+30.948	21 7 36.327	23 16.078
20 40 29.379	—4 51.022	20 45 20.401	10 29 18.500	21 9 7.440	+30.948	21 8 36.492	23 16.091
20 41 29.533	—4 51.023	20 46 20.556	10 30 18.500	21 10 7.604	+30.948	21 9 36.656	23 16.100
20 42 29.721	—4 51.024	20 47 20.745	10 31 18.500	21 11 7.768	+30.948	21 10 36.820	23 16.075
20 43 29.883	—4 51.024	20 48 20.907	10 32 18.500	21 12 7.933	+30.947	21 11 36.986	23 16.079
20 44 30.036	—4 51.025	20 49 21.061	10 33 18.500	21 13 8.097	+30.947	21 12 37.150	23 16.089
20 45 30.207	—4 51.026	20 50 21.233	10 34 18.500	21 14 8.261	+30.947	21 13 37.314	23 16.081
20 46 30.353	—4 51.027	20 51 21.380	10 35 18.500	21 15 8.425	+30.947	21 14 37.478	23 16.098
20 47 30.531	—4 51.027	20 52 21.558	10 36 18.500	21 16 8.590	+30.947	21 15 37.643	23 16.085
20 48 30.701	—4 51.028	20 53 21.729	10 37 18.500	21 17 8.754	+30.947	21 16 37.807	23 16.078
20 49 30.867	—4 51.029	20 54 21.896	10 38 18.500	21 18 8.918	+30.947	21 17 37.971	23 16.075
Mean							23 16.085

The result given below is the mean of thirty-four readings of the Toronto clock as recorded on the Montreal chronograph, corresponding to every fifteenth second of the Montreal clock, beginning at 10h. 14m. 0s. Montreal clock. (See p. 39.)

## MONTREAL CHRONOGRAPH.

Toronto clock.	Error.	Toronto sidereal time.	Montreal clock.	Equivalent sidereal time.	Error.	Montreal sidereal time.	Difference. Mont—Toronto.
h. m. s.	m. s.	h. m. s.	h. m. s.	h. m. s.	s.	h. m. s.	m. s.
20 30 9.073	—4 51.014	20 35 0.087	10 19 0.000	20 58 47.246	+30.949	20 58 16.297	23 16.210

TABLE V.—Continued.

CLOCK COMPARISONS.

SEPTEMBER 5.

The record of the Toronto clock on the Montreal chronograph was read for every fifth second beginning at 21h. 12m. 53s., and the figures given below are the means of groups of five readings.

MONTREAL CHRONOGRAPH.

Toronto clock.	Error.	Toronto sid. time.	Montreal clock.	Error.	Montreal sid. time.	Differences. Mont. — Toronto.
<small>h. m. s.</small>	<small>m. s.</small>	<small>h. m. s.</small>	<small>h. m. s.</small>	<small>h. m. s.</small>	<small>h. m. s.</small>	<small>m. s.</small>
21 12 3.000	—4 56.215	21 17 59.215	10 42 11.800	—10 59 3.554	21 41 15.354	23 16.139
21 13 28.000	—4 56.215	21 18 24.215	10 42 36.788	—10 59 3.623	21 41 40.361	23 16.146
21 13 53.000	—4 56.216	21 18 49.216	10 43 1.658	—10 59 3.691	21 42 5.349	23 16.133
21 14 18.000	—4 56.216	21 19 14.216	10 43 26.592	—10 59 3.759	21 42 30.351	23 16.135
21 14 43.000	—4 56.217	21 19 39.217	10 43 51.540	—10 59 3.827	21 42 55.367	23 16.150
21 15 8.000	—4 56.217	21 20 4.217	10 44 16.458	—10 59 3.896	21 43 20.354	23 16.137
21 15 33.000	—4 56.217	21 20 29.217	10 44 41.404	—10 59 3.964	21 43 45.368	23 16.151
21 15 58.000	—4 56.218	21 20 54.218	10 45 6.320	—10 59 4.033	21 44 10.353	23 16.135
21 16 23.000	—4 56.218	21 21 19.218	10 45 31.262	—10 59 4.101	21 44 35.363	23 16.145
21 16 48.000	—4 56.218	21 21 44.218	10 45 56.192	—10 59 4.169	21 45 0.361	23 16.143
21 19 13.000	—4 56.220	21 24 9.220	10 48 20.798	—10 59 4.566	21 47 25.364	23 16.144
21 19 38.000	—4 56.220	21 24 34.220	10 48 45.732	—10 59 4.635	21 47 50.367	23 16.147
Mean						23 16.142

The result given below is the mean of forty-seven readings of the time by the Montreal clock as recorded on the Toronto chronograph of each fifteenth second of the Toronto clock beginning with 21h. 27m. 0s. (See p. 39.)

TORONTO CHRONOGRAPH.

Toronto clock.	Error.	Toronto sid. time.	Montreal clock.	Error.	Montreal sid. time.	Difference. Mont. — Toronto.
<small>h. m. s.</small>	<small>m. s.</small>	<small>h. m. s.</small>	<small>h. m. s.</small>	<small>h. m. s.</small>	<small>h. m. s.</small>	<small>m. s.</small>
21 32 45.000	—4 56.230	21 37 41.230	11 1 50.434	—10 59 6.787	22 0 57.221	23 15.991

SEPTEMBER 6.

The record of the Toronto clock on the Montreal chronograph was read for each fifth second beginning at 21h. 33m. 50s., and the figures given below are each the means of seven such readings.

MONTREAL CHRONOGRAPH.

Toronto clock.	Error.	Toronto sid. time.	Montreal clock.	Error.	Montreal sid. time.	Differences. Mont. — Toronto.
<small>h. m. s.</small>	<small>m. s.</small>	<small>h. m. s.</small>	<small>h. m. s.</small>	<small>h. m. s.</small>	<small>h. m. s.</small>	<small>m. s.</small>
21 34 5.000	—4 57.254	21 39 2.254	10 59 15.149	—11 3 3.158	22 2 18.307	23 16.053
21 36 10.000	—4 57.255	21 41 7.255	11 1 19.821	—11 3 3.500	22 4 23.321	23 16.066
21 36 45.000	—4 57.255	21 41 42.255	11 1 54.734	—11 3 3.506	22 4 58.330	23 16.075
21 37 20.000	—4 57.256	21 42 17.256	11 2 29.631	—11 3 3.691	22 5 33.322	23 16.066
21 37 55.000	—4 57.256	21 42 52.256	11 3 4.537	—11 3 3.787	22 6 8.324	23 16.068
21 38 30.000	—4 57.257	21 43 27.257	11 3 39.449	—11 3 3.883	22 6 43.332	23 16.075
21 39 5.000	—4 57.257	21 44 2.257	11 4 14.350	—11 3 3.979	22 7 18.329	23 16.072
21 39 40.000	—4 57.258	21 44 37.258	11 4 49.254	—11 3 4.074	22 7 53.328	23 16.070
21 40 15.000	—4 57.258	21 45 12.258	11 5 24.150	—11 3 4.170	22 8 28.320	23 16.062
Mean						23 16.067

TABLE V.—*Continued.*

CLOCK COMPARISONS.

SEPTEMBER 6.

The result given below is the mean of thirty-nine readings of the time by the Montreal clock as recorded on the Toronto chronograph of each fifteenth second of the Toronto clock, beginning at 21h. 47m. 0s. (See p. 39.)

TORONTO CHRONOGRAPH.

Toronto clock.	Error.	Toronto sid. time.	Montreal clock.	Error.	Montreal sid. time.	Difference. Mont. — Toronto.
h. m. s.	m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	m. s.
21 51 45.000	—4 57.266	21 56 42.266	11 16 52.155	—11 3 6.057	22 19 58.212	23 15.946

SEPTEMBER 11.

The record of the Toronto clock on the Montreal chronograph was read for every fifth second, and the figures given below are the means of groups of five such consecutive readings. The first second read was 21h. 0m. 3s. of the Toronto clock.

MONTREAL CHRONOGRAPH.

Toronto clock.	Error.	Toronto sid. time.	Montreal clock.	Error.	Montreal sid. time.	Differences. Mont. — Toronto.
h. m. s.	m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	m. s.
21 0 13.000	—5 2.905	21 5 15.905	10 5 52.346	—11 22 39.461	21 28 31.807	23 15.902
21 0 38.000	—5 2.905	21 5 40.906	10 6 17.280	—11 22 39.529	21 28 56.809	23 15.903
21 1 8.000	—5 2.906	21 6 5.906	10 6 42.212	—11 22 39.597	21 29 21.809	23 15.903
21 1 28.000	—5 2.907	21 6 30.907	10 7 7.140	—11 22 39.666	21 29 46.806	23 15.899
21 3 53.000	—5 2.910	21 8 55.910	10 9 31.750	—11 22 40.062	21 32 11.812	23 15.902
21 4 18.000	—5 2.910	21 9 20.910	10 9 56.676	—11 22 40.131	21 32 36.807	23 15.897
21 4 43.000	—5 2.911	21 9 45.911	10 10 21.614	—11 22 40.199	21 33 1.813	23 15.902
21 5 8.000	—5 2.911	21 10 10.911	10 10 46.556	—11 22 40.267	21 33 26.823	23 15.912
21 5 33.000	—5 2.912	21 10 35.912	10 11 11.470	—11 22 40.336	21 33 51.806	23 15.894
21 5 58.000	—5 2.913	21 11 0.913	10 11 36.418	—11 22 40.404	21 34 16.822	23 15.909
21 6 23.000	—5 2.913	21 11 25.913	10 12 1.340	—11 22 40.473	21 34 41.813	23 15.900
21 6 48.000	—5 2.914	21 11 50.914	10 12 26.276	—11 22 40.541	21 35 6.817	23 15.903
Mean						23 15.902

The result given below is the mean of forty-two readings of the time by the Montreal clock as recorded on the Toronto chronograph of each fifteenth second of the Toronto clock, beginning at 21h. 14m. 15s. (See p. 39.)

TORONTO CHRONOGRAPH.

Toronto clock.	Error.	Toronto sid. time.	Montreal clock.	Error.	Montreal sid. time.	Difference Mont. — Toronto
h. m. s.	m. s.	h. m. s.	h. m. s.	h. m. s.	h. m. s.	m. s.
21 19 15.000	—5 2.929	21 24 17.929	10 24 51.161	—11 22 42.584	21 47 33.745	23 15.816

TABLE VI.

Diff. long.	M. to T.		T. to M.		Pen correction.	T. to M. corrected.		Mean.	Armature time.	Probable errors of $dl$ .
	m.	s.	m.	s.		m.	s.	m.	s.	
Aug. 25,	23	16.188	23	16.342	-.020	23	16.322	23	16.255	.067
" 30,	23	16.207	23	16.356	-.007	23	16.349	23	16.278	.071
" 31,	23	16.085	23	16.210	-.007	23	16.203	23	16.144	.059
Sept. 5,	23	15.991	23	16.142	.000	23	16.142	23	16.067	.075
" 6,	23	15.946	23	16.067	.000	23	16.067	23	16.007	.060
" 11,	23	15.816	23	15.902	+.045	23	15.947	23	15.882	.066

The single night's work being considered insufficient for the accurate determination of the personal equation of the observers, the following equations of condition from the results of exchange on the individual nights of time determination have been used, with the result of the special determination, for obtaining a better value of the personal equation; the numbers set opposite the individual equations are the weights used, and are such that the probable error of each equation so weighted should be one second of time.

TABLE VII.

Equations of condition.	Weights.	Residuals of weighted equations.	Normal equations.
Aug. 25, $dl + p - 255 = 0$	49	-0.686	$10420dl + 2626p - 1454.196 = 0$
" 30, $dl + p - 278 = 0$	51	-1.887	$2626dl + 11261p - 1796.647 = 0$
" 31, $dl + p - 144 = 0$	39	+3.783	Whence $dl = 0.106 \pm .019$
Sept. 5, $dl - p - 067 = 0$	24	-2.304	personal equation $= 0.135 \pm .018$
" 6, $dl - p - 007 = 0$	45	-1.620	Diff. long. M. and T., 23m. 16.106s. $\pm .019$
" 11, $dl - p + 118 = 0$	36	+3.204	
" 15, $p - 169 = 0$	29	-0.986	

It may be noted that the probable error of a single weighted equation, as obtained from the equations themselves, is 1.85 sec., which is considerably in excess of the amount (1.00 sec.) deduced from the probable errors of the time determinations on the various nights. This may be due to several causes:—

1. Errors in the determination of the levels; the amount, however, due to this cause would probably be very small.
2. To refraction in Azimuth, due to the planes of equal refraction not being horizontal; this cause is also likely to give rise to but small errors.

3. The stars used by the two observers were different, and as used by the same observer different on different nights.

4. The personal equation of the observers may fluctuate slightly between different nights about a mean value.

If we neglect the variations due to the first three causes, and assume that the probable error of the personal equation, on any night, is proportional to the deduced probable error of the time determination, the above solution will still hold; if, however, we take the variations on different nights in personal equation, as well as that due to other causes, as being independent of the probable error, as obtained from the observations on that night, the probable error of a single determination will be of the form  $\sqrt{x^2 + (\text{p. e.})^2}$ , where  $x$  is an unknown quantity and p. e. stands for the probable error of the combined  $\delta t$ 's at the two stations. If now  $x$  be taken as .04 sec., the resulting weights become 22, 22, 21, 17, 22, 21, and 19, showing very little variation in the weight, and the solution of the thus weighted equations gives a probable error of a single equation = 1 sec. and the resulting value of  $\delta t = .102 \text{ sec.} \pm .020$ , and personal equation .130 sec.  $\pm .019$ . This solution, therefore, while differing little from it, is not so good as the preceding one for representing the original equations; for this reason we adopt, finally—

	h.	m.	s.
The value of the difference of Longitude Montreal and Toronto . . .	= 0	23	16.106 $\pm .019$
Longitude of Montreal as determined by exchange with Cambridge . .	= 4	54	18.543 $\pm .045$
Therefore the Longitude of the Toronto transit . . . . .	= 5	17	34.649 $\pm .049$

## APPENDIX.

## THE LONGITUDE OF COBOURG, ONTARIO.

By Professor G. H. CHANDLER, M.A.

The following transit observations were made in September, 1883, at Cobourg, Ontario (Latitude  $43^{\circ} 57'$ ) for the purpose of determining the longitude of that place. Simultaneous observations were made by Prof. C. H. McLeod at Toronto.

THE TRANSIT INSTRUMENT used was a portable one made by Messrs. Troughton & Simms, and now the property of the Dominion Government. The transit bears the mark F.O. 1. The approximate focal length of the object-glass is 29 inches, its diameter 2.5 inches. The value of one division of the level is  $0''.198$ . The pivots were found to be cylindrical, and the radius of the clamp end pivot to be 0.14 of a level division smaller than the other. The equatoreal distances of the mean wire from the several wires of the reticule were determined from 24 complete transits to be as follows:—

From	I.	+	19.109	} Clamp East.
"	II.	+	9.628	
"	III.	—	0.012	
"	IV.	—	9.672	
"	V.	—	19.054	

The collimation error was made as small as possible by observation of a distant mark.

THE PIER.—It was found that the only available pier for the transit consisted of a barrel of sand, the upper part of the barrel having only a few days previously been filled with mortar, which had not yet hardened. The transit was placed in position a few hours before the commencement of the observations, but proved to be so unsteady that the observations of the first night are entirely worthless; the longitude determination thus depending on the observations of two nights only.

THE SIDEREAL CHRONOMETER.—This was Wm. Bord & Son's 332, which breaks circuit at the even seconds and at the 59th second of each minute. The observations were made by eye and ear, the break circuit attachment being used only to transmit the chronometer beats to Toronto.

TIME EXCHANGES were made between Cobourg and Toronto each night. The beats of the Cobourg chronometer were recorded on the Toronto chronograph, and return signals of mean time were sent from Toronto, coincidences with the Cobourg chronometer being recorded by me. The transmission time, however, was not determined, owing to an oversight at Toronto on the second and third nights of the time exchange, in not comparing the mean time clock with the sidereal clock used in observing.

THE STARS observed were selected from the Berliner Astronomische Jahrbuch for 1883.

LEVEL ERRORS.—In nearly all cases four settings of the level were made after each transit. From the level errors thus obtained, and the corresponding times as co-ordinates, a free-hand curve was sketched, and from this curve interpolated values for the correction of the times of transits were derived. These values are given in the following tables.



REDUCTION OF THE OBSERVATIONS.—The method adopted in reducing the observations was, in all essential respects, the same as that explained in Prof. McLeod's report, in connection with the difference of longitude between Montreal and Toronto. The equations of condition were weighted when less than five wires were observed by multiplying them by the following numbers: .956, .900, .800, .633, according as the number of wires observed was 4, 3, 2 or 1.

Table 1.—LEVEL CORRECTIONS.

SIDEREAL TIME.	OBSERVED.	ADOPTED.	SIDEREAL TIME.	OBSERVED.	ADOPTED.
1883.			1883.		
h.	s.	s.	h.	s.	s.
Sept. 6, 18.2	+ 0.04	— 0.02	Sept. 8, 18.6	+ 0.43	+ 0.43
18.4	— 0.12	— 0.05	18.8	+ 0.46	+ 0.49
18.6	— 0.02	— 0.07	19.1	+ 0.56	+ 0.53
18.8	— 0.07	— 0.09	19.4	+ 0.53	+ 0.55
18.9	— 0.19	— 0.12	19.6	+ 0.58	+ 0.56
19.1	— 0.14	— 0.17	19.8	+ 0.54	+ 0.56
19.2	— 0.22	— 0.19	20.1	+ 0.55	+ 0.56
19.6	— 0.22	— 0.22	20.4	+ 0.61	+ 0.59
20.2	— 0.24	— 0.26	20.7	+ 0.60	+ 0.61
20.3	— 0.32	— 0.29	Reversed.		
20.7	— 0.31	— 0.32	22.3	+ 0.87	0.88
Reversed.			22.5	+ 0.89	0.87
22.1	— 0.07	— 0.07	22.7	+ 0.78	0.80
22.3	— 0.06	— 0.06	22.9	+ 0.76	0.78
22.9	— 0.07	— 0.08	23.0	+ 0.80	0.79
23.2	— 0.11	— 0.10	23.2	+ 0.80	0.81
23.6	— 0.17	— 0.14	23.4	+ 0.84	0.83
24.2	— 0.08	— 0.09	23.9	+ 0.86	0.87
			24.2	+ 0.88	0.88

TABLE II.  
OBSERVATIONS OF SEPTEMBER 6, 1883, COBOURG.

CLAMP EAST.								
Name of star.	$\alpha$ .	$\delta$ .	$T$ .	No. of Wires.	$B$	$b$ .	Equations of condition.	Residuals.
	h. m. s.	° ' "	h. m. s.					
109 Hercules . .	18 18 45.57	+ 21 43	18 18 36.10	5	+1.00	-.04	$+0.407da + 1.076dc + dt + .33 = 0$	+ .114
$\chi$ Draconis . .	18 23 10.77	+ 72 41	18 23 05.80	1	+2.95	-.05	$-1.616da + 3.360dc + dt - .65 = 0$	-.410
$\alpha$ Lyrae . . .	18 33 01.22	+ 38 41	18 32 43.66	5	+1.27	-.07	$+0.117da + 1.281dc + dt + .03 = 0$	-.132
110 Hercules . .	18 40 40.56	+ 20 26	18 40 31.68	5	+0.97	-.08	$+0.426da + 1.067dc + dt + .39 = 0$	+ .170
$\gamma$ Lyrae . . .	18 54 36.86	+ 32 32	18 54 22.84	4	+1.16	-.12	$+0.235da + 1.186dc + dt + .36 = 0$	+ .169
$\pi$ Sagittarii .	19 02 52.23	- 21 12	19 02 58.33	2	+0.45	-.16	$+0.973da + 1.073dc + dt + .64 = 0$	+ .254
$\theta$ Lyrae . . .	19 12 21.31	+ 37 55	19 12 04.28	5	+1.26	-.18	$+0.153da + 1.268dc + dt + .04 = 0$	-.125
$\lambda^2$ Sagittarii .	19 29 39.25	- 25 08	19 29 46.98	3	+0.39	-.22	$+1.032da + 1.105dc + dt + .68 = 0$	+ .312
Br. 1147 . . .	20 04 50.78	+103 53	20 06 07.06	3	-2.09	-.24	$+3.607da - 4.168dc + dt + .49 = 0$	-.384
$\gamma$ Cygni . . .	20 18 05.25	+ 39 53	20 17 47.20	5	+1.30	-.30	$+0.092da + 1.303dc + dt + .04 = 0$	-.122
$\alpha$ Cygni . . .	20 37 30.26	+ 44 52	20 37 09.14	5	+1.41	-.32	$-0.023da + 1.411dc + dt + .02 = 0$	-.116
CLAMP WEST.								
$\epsilon$ Aquarii . .	22 00 11.10	- 14 26	22 00 14.38	4	+0.54	-.07	$+0.879da' - 1.033dc + dt + .56 = 0$	+ .290
30 Urs. Maj. .	22 15 40.69	+113 50	22 16 22.52	5	-0.85	-.06	$+2.324da' + 2.475dc + dt + .22 = 0$	-.247
$\delta$ Aquarii . .	22 48 30.44	- 16 27	22 48 34.40	1	+0.51	-.07	$+0.907da' - 1.043dc + dt + .55 = 0$	+ .184
$\alpha$ Pisc. Aust. .	22 51 15.17	- 30 15	22 51 24.50	5	+0.31	-.07	$+1.114da' - 1.158dc + dt + .34 = 0$	+ .051
$\alpha$ Pegasi . . .	22 59 00.07	+ 14 35	22 58 52.80	5	+0.90	-.09	$+0.507da' - 1.033dc + dt + .09 = 0$	-.115
$\epsilon^2$ Aquarii . .	23 03 16.51	- 21 48	23 03 22.54	5	+0.44	-.09	$+0.982da' - 1.077dc + dt + .60 = 0$	+ .329
$\tau$ Pegasi . . .	23 14 55.02	+ 23 06	23 14 44.72	3	+1.02	-.13	$+0.387da' - 1.087dc + dt + .26 = 0$	+ .064
$\epsilon$ Andromedæ .	23 32 28.77	+ 42 37	23 32 08.48	3	+1.36	-.14	$+0.032da' - 1.359dc + dt - .18 = 0$	-.288
$\omega$ Piscium . .	23 53 22.23	+ 6 13	23 53 17.92	2	+0.79	-.12	$+0.616da' - 1.006dc + dt + .15 = 0$	-.056
$\alpha$ Andromedæ .	24 02 24.87	+ 28 16	24 02 12.03	4	+1.09	-.11	$+0.307da' - 1.135dc + dt - .05 = 0$	-.219
$\gamma$ Pegasi . . .	24 07 16.81	+ 14 32	24 07 09.71	3	+0.90	-.11	$+0.507da' - 1.033dc + dt + .30 = 0$	+ .085
Adopted losing rate of chronometer, 1.5 sec. per day.								

Normal equations:

$$\begin{aligned}
 &+13.497da - 11.213dc + 5.099dt + 3.218 = 0 \\
 &+ 9.557da' + 0.158dc + 7.554dt + 2.357 = 0 \\
 &-11.213da + 0.158da' + 45.085dc + 1.413dt - 1.798 = 0 \\
 &+ 5.099da + 7.554da' + 1.413dc + 18.872dt + 4.608 = 0
 \end{aligned}$$

Whence  $da = -.188$ ,  $da' = -.137$ ,  $dc = -.002$ ,  $dt = -.138$ , weight of  $dt = 10.121$   
and probable error of  $dt = \pm .048$

On this day  $a = -27.00$ ,  $a' = -27.00$ ,  $c = 0$ ,  $t = 21.00$  at 21 sidereal time.

Hence total azimuth error before reversal  $= a + da = -27.188$   
 " " " after "  $= a' + da' = -27.137$   
 " collimation error  $= c + dc = -00.002$   
 chronometer error  $= t + dt = +20.862$  (slow) at 21h.

*Remark.* The sky was hazy, especially after exchange, only bright stars being visible at the end of the observations.

TABLE II. — *Continued.*

OBSERVATIONS OF SEPTEMBER 8, 1883, COBOURG.

CLAMP EAST.								
Name of star.	$\alpha$ .	$\delta$ .	$T$ .	No. of Wires.	$B$ .	$b$ .	Equations of condition.	Residuals.
	h. m. s.	° ' "	h. m. s.					
$\alpha$ Lyrae . . .	18 33 01.17	+ 38 41	18 32 36.75	2	+1.27	.41	$+0.117da + 1.281dc + dt + 0.03 = 0$	-.015
$\zeta$ Aquilæ . . .	19 00 05.10	+ 13 41	18 59 40.05	3	+0.89	.52	$+0.518da + 1.029dc + dt - 0.22 = 0$	-.101
$\delta$ Aquilæ . . .	19 19 39.39	+ 2 53	19 19 14.43	4	+0.76	.55	$+0.658da + 1.001dc + dt - 0.01 = 0$	+ .153
$\lambda^2$ Sagittarii .	19 29 39.22	- 25 08	19 29 13.84	5	+0.39	.56	$+1.032da + 1.105dc + dt - 0.25 = 0$	+ .055
$\delta$ Cygni . . .	19 41 22.17	+ 44 51	19 40 57.92	5	+1.41	.56	$-0.023da + 1.411dc + dt + 0.41 = 0$	+ .307
Br. 1147 . . .	20 04 50.66	+103 53	20 04 23.00	5	-2.09	.56	$+3.608da - 4.153dc + dt - 1.31 = 0$	+ .005
$\chi$ Cephei . . .	20 12 52.21	+ 77 21	20 12 29.61	4	+3.82	.57	$-2.513da + 4.566dc + dt + 1.00 = 0$	- .070
$\gamma$ Cygni . . .	20 18 05.22	+ 39 53	20 17 40.69	4	+1.30	.58	$+0.092da + 1.303dc + dt + 0.24 = 0$	+ .183
$\epsilon$ Delphini . . .	20 27 41.03	+ 10 54	20 27 15.84	5	+0.85	.60	$+0.555da + 1.018dc + dt - 0.19 = 0$	-.084
$\nu$ Capricorni .	20 33 27.38	- 18 33	20 33 01.75	3	+0.49	.60	$+0.936da + 1.055dc + dt - 0.46 = 0$	- .169
$\alpha$ Cygni . . .	20 37 30.23	+ 44 52	20 37 05.54	5	+1.41	.61	$-0.022da + 1.411dc + dt + 0.09 = 0$	- .013
$\gamma$ Draconis . .	20 51 05.48	+ 82 06	20 50 44.41	2	+5.72	.61	$-4.498da + 7.280dc + dt + 1.92 = 0$	+ .058
CLAMP WEST.								
30 II. Urs. Maj. .	22 15 40.74	+113 50	22 15 13.68	4	-0.85	.88	$+2.324da' + 2.475dc + dt - 1.44 = 0$	+ .217
9 II. Draconis .	22 25 04.53	+103 41	22 24 35.87	2	-2.12	.88	$+3.651da' + 4.227dc + dt - 2.82 = 0$	- .108
10 Lacertæ . . .	22 34 05.11	+ 38 26	22 33 39.79	4	+1.27	.85	$+0.123da' - 1.227dc + dt - 0.06 = 0$	- .050
$\lambda$ Pegasi . . .	22 40 57.93	+ 22 57	22 40 32.46	5	+1.01	.81	$+0.389da' - 1.086dc + dt - 0.19 = 0$	+ .018
$\alpha$ Pisc. Aust. . .	22 51 15.18	- 30 15	22 50 49.22	4	+0.31	.77	$+1.114da' - 1.157dc + dt - 0.52 = 0$	+ .224
$\alpha$ Andromedæ .	22 56 36.94	+ 41 42	22 56 12.08	5	+1.33	.78	$+0.053da' - 1.339dc + dt + 0.33 = 0$	+ .280
$\alpha^2$ Aquarii . . .	23 03 16.52	- 21 48	23 02 50.52	4	+0.44	.80	$+0.982da' - 1.077dc + dt - 0.58 = 0$	+ .076
4 Cassiopeiæ . .	23 19 44.53	+ 61 38	23 19 19.78	5	+2.00	.82	$-0.639da' - 2.105dc + dt + 0.36 = 0$	- .208
$\gamma$ Cephei . . .	23 34 43.05	+ 76 59	23 33 20.42	2	+3.73	.84	$-2.420da' - 4.440dc + dt + 2.20 = 0$	+ .231
$\phi$ Pegasi . . .	23 46 36.38	+ 18 28	23 46 10.64	5	+0.95	.86	$+0.454da' - 1.054dc + dt - 0.33 = 0$	- .077
$\omega$ Piscium . . .	23 53 22.24	+ 6 13	23 52 56.32	5	+0.79	.86	$+0.616da' - 1.006dc + dt - 0.48 = 0$	- .100
$\alpha$ Andromedæ .	24 02 24.89	+ 28 27	24 02 59.24	5	+1.10	.87	$+0.307da' - 1.137dc + dt - 0.23 = 0$	- .084
$\gamma$ Pegasi . . .	24 07 16.83	+ 14 32	24 06 50.96	5	+0.90	.87	$+0.507da' - 1.033dc + dt - 0.41 = 0$	- .112
Adopted losing rate of chronometer, 1.5 sec. per day.								

Normal equations :

$$\begin{aligned}
 &+34.477da - 42.735dc + 0.912dt - 13.343 = 0 \\
 &+20.746da' + 18.615dc + 6.632dt - 15.074 = 0 \\
 &-42.735da + 18.615da' + 127.024dc + 4.385dt + 3.129 = 0 \\
 &+ 0.912da + 6.632da' + 4.385dc + 22.578dt - 3.335 = 0
 \end{aligned}$$

Whence  $da = .386$ ,  $da' = .758$ ,  $dc = -.003$ ,  $dt = -.090$ , weight of  $dt = 20.431$ ,  
and probable error of  $dt = \pm .023$

On this day  $a = 1.00$ ,  $a' = 1.00$ ,  $c = 0$ ,  $t = 24.00$  at 21 30 sidereal time.

Hence total azimuth error before reversal  $= a + da = 1.386$

" " " after "  $= a' + da' = 1.758$

" collimation error  $= c + dc = -.003$

chronometer error  $= t + dt = 23.910$  (slow) at 21h. 30 m.

TABLE III.

OBSERVATIONS FOR PERSONAL EQUATION (C. H. M. AND G. H. C.),  
SEPTEMBER 11, 1883, TORONTO.

CLAMP EAST.												
Name of star.	a.	δ	T.	No. of Wires.	A.	a.	B.	b.	C.	c.	T-a, corrected for pivot-error, rate, azimuth, level, and collimation.	
	h. m. s.	° ' "	h. m. s.								m. s.	
β Lyrae . . .	18 45 48.31	+ 33 13	18 50 14.04	5	+0.22	+0.50	+1.18	-.28	+1.20	-.151	4	25.07
℞ Lyrae . . .	18 51 49.00	+ 43 47	18 56 14.62	3	.00	+0.50	+1.38	-.29	+1.38	-.151	4	24.84
π Sagittarii . .	19 02 52.15	- 21 12	19 07 17.78	5	+0.97	+0.50	+0.46	-.29	+1.07	-.151	4	25.23
κ Cygni . . .	19 14 26.48	+ 53 09	19 18 52.45	4	-0.27	+0.50	+1.65	-.30	+1.67	-.151	4	25.08
α Aquilæ . . .	19 45 07.93	+ 8 34	19 49 33.60	5	+0.58	+0.50	+0.83	-.34	+1.01	-.151	4	25.17
κ Cephei . . .	20 12 51.95	+ 77 21	20 17 19.07	4	-2.53	+0.50	+3.80	-.35	+4.57	-.151	4	24.89
α² Urs. Maj. . .	21 00 06.25	+112 23	21 04 30.50	5	+2.45	+0.50	-0.95	-.35	-2.63	-.151	4	25.10
ν Aquarii . . .	21 03 17.18	- 11 50	21 07 42.72	5	+0.84	+0.50	+0.58	-.35	+1.02	-.151	4	25.23
CLAMP WEST.												
ζ Capricorni . .	21 20 03.33	- 22 55	21 24 28.30	5	+1.00	-.030	+0.43	-.19	+1.09	+1.151	4	25.03
β Cephei . . .	21 27 13.91	+ 70 03	21 31 38.86	5	-1.30	-.030	+2.63	-.19	+2.93	+1.151	4	24.81
74 Cygni . . .	21 32 19.58	+ 39 53	21 36 45.12	5	+0.09	-.030	+1.30	-.20	+1.30	+1.151	4	25.44
δ Capricorni . .	21 40 39.02	- 16 39	21 45 04.20	4	+0.91	-.030	+0.52	-.20	+1.04	+1.151	4	25.22
30 H. Urs. Maj.	22 15 40.83	+113 51	22 20 06.14	5	+2.33	-.030	-0.84	-.21	-2.47	+1.151	4	25.18
η Pegasi . . .	22 37 35.35	+ 29 36	22 42 00.58	5	+0.28	-.030	+1.12	-.22	+1.15	+1.151	4	25.20
α Urs. Maj. . .	22 56 29.72	+117 37	23 00 54.46	5	+2.07	-.030	-0.60	-.22	-2.16	+1.151	4	24.66
Br. 3077 . . .	23 07 44.68	+ 56 31	23 12 10.05	4	-0.40	-.030	+1.77	-.22	+1.81	+1.151	4	25.31
4 Cassiopeiae . .	23 19 44.54	+ 61 38	23 24 09.44	5	-0.65	-.030	+2.00	-.21	+2.11	+1.151	4	24.87
70 Pegasi . . .	23 23 18.38	+ 12 06	23 27 43.36	5	+0.54	-.030	+0.87	-.21	+1.02	+1.151	4	25.10
γ Cephei . . .	23 34 43.09	+ 76 56	23 39 07.98	4	-2.43	-.030	+3.71	-.20	+4.43	+1.151	4	24.87
Mean											4	25.068
Adopted losing rate of chronometer, .075 sec. per hour.												

The values of the azimuth, level and collimation errors are taken from the results of Professor McLeod's observations for September 11.

Results of observation for personal equation :

	m.	s.	
Chronometer fast . . . . .	4	25.068	
Toronto clock slow . . . . .	5	2.905	
Difference of chronometer and clock . . . . .	9	27.973	from observations.
“ “ “ “ . . . . .	9	27.880	from chronograph comparison.
Difference . . . . .		.093	

or  $G. H. C. = \overline{C. H. M.} + .093s.$

COMBINATION OF RESULTS.

*September 6th.*

Chronograph comparison gives:—

	h.	m.	s.		h.	m.	s.
Chronometer.....	20	55	31.24	when clock was.....	20	46	00.00
Chro. slow... <sup>s.</sup> 20.862 — <sup>s.</sup> .005 =			20.857	clock slow..... <sup>m.</sup> 4 <sup>s.</sup> 57.231 — <sup>s.</sup> .010		4	57.221
	20	55	52.097		20	50	57.221
	20	50	57.221				
Difference =	4	54.876					

*September 8th.*

Chronograph comparison gives:—

Chronometer .....	21	24	30.20	when clock was .....	21	15	00.00
Chro slow.... <sup>s.</sup> 23.910 — <sup>s.</sup> 006 =			23.904	clock slow.. <sup>m.</sup> 4 <sup>s.</sup> 58.746 + <sup>s.</sup> .010 =		4	58.756
	21	24	54.104		21	19	58.756
	21	19	58.756				
Difference =	4	55.348					

Mean of the two differences..... 4 55.112

Personal equation ..... .093

4 55.205

Reduction to dome of Faraday Hall..... .089

4 55.116

An allowance for transmission time would increase this by a small amount; we may, h. m. s.  
 therefore, take the longitude of the dome of Faraday Hall as..... 0 4 55.15  
 less than the transit instrument at Toronto, which is..... 5 17 31.65 W.

The longitude of the dome of the Faraday Hall, as determined by h. m. s.  
 these observations, is, therefore..... 5 12 39.5 West of Greenwich.



## ABSTRACTS, 1888.

1.—*The Classification and Nomenclature of Metalline Minerals.*<sup>1</sup>

By T. STERRY HUNT, LL.D., F.R.S.

(Presented May 30, 1888.)

The author recalls his essay on "A Natural System in Mineralogy," presented in 1885, and published in Volume III of the Transactions of the Royal Society of Canada, wherein he discussed the grounds and principles of a true natural system of classification, and exemplified them by an extended study of the order of Silicates. It was then proposed to divide the mineral kingdom, for natural-historical purposes, into four classes, including respectively the Metalline, the Oxydized, the Haloid and the Pyricastate or combustible species. Of these the first, third and fourth classes include only one order each; the second embracing seventeen orders. Adopting a Latin terminology, the first class becomes the METALLACEÆ, including the order of the METALLATA, which is divided into two suborders, the *Metallometallinea* and the *Spatometallinea*; based on the fundamental difference recognized by all naturalists between the group of the Glances and that of the Blendes. The author then proceeds to show the reason for including in the same order with these the group of the Pyrites, and that of the native Metals, and arranges all these in nine tribes, based alike on chemical and on physical grounds.<sup>2</sup>

Preparatory to this, however, the relations between hardness and specific gravity on the one hand, and chemical equivalent on the other, are next discussed; it being maintained that these physical characters vary with the condensation of the species, or, in other words, are functions of the integral or so-called molecular weight; which is at the same time the density of the species, that of hydrogen being unity. The weight of a given volume of this being known, that of the same volume of any other species, whether gaseous, liquid or solid, is truly its equivalent weight. It is then shown that hydrogen gas at standard temperature and pressure being  $H_2 = 2$ , water vapor,  $H_2O = 17.96$ ; and liquid water  $1192 (H_2O) = 21408$ , or in round numbers 21400, which being that of a body whose specific gravity is assumed as unity,—we are able to calculate the integral or equivalent weight of all species compared with it. It follows that the integral weights of solid and liquid species are very elevated, and that these are highly condensed or polymeric bodies, whose coefficient of condensation is determined by comparing their

<sup>1</sup> A more extended analysis of this paper appears under the same title in the Proceedings of the American Philosophical Society for 1888, and is reprinted in the Chemical News for August 10 and 17, while an unrevised reprint of the present abstract will be found in an earlier number of the latter publication.

<sup>2</sup> See also Supplement to a Natural System of Mineralogy, presented in 1886, and published in these Transactions, vol. iv.

empirical combining weight, deduced from chemical analysis, with that calculated from their specific gravity, water being unity. The value got by dividing this empirical weight by the specific gravity,  $p \div d = v$ , or the so-called atomic volume, is the reciprocal of the coefficient of condensation; and, as long since pointed out by the author, the hardness and chemical indifference of related species are inversely as the value of  $v$ . In calculating this value, as already shown in 1885, the unit for  $p$  in metalline species is for convenience made the mean quantivalent weight; that is to say, it is the number got by dividing the empirical equivalent weight by the sum of the equivalents therein represented; so that for marcasite,  $\text{FeS}^2 = 120$ , we divide by six and find  $p = 20$ , and for stibnite,  $\text{Sb}^2\text{S}^3 = 336$ , we divide by ten and find  $p = 33.6$ .

#### Order METALLATA.

##### Suborder A. METALLOMETALLINEA.

Tribe 1. *Metalloideæ* (Metals, Alloys, metallic Selenium and Phosphorus).

Tribe 2. *Galenoidæ* (divided into three subtribes).

a. *Thiogalenoideæ*; gen. Thionites, Thiophyllites.

b. *Selenogalenoideæ*; gen. Eucairites.

c. *Tellurogalenoideæ*; gen. Tellurites, Tellurophyllites.

Tribe 3. *Bournonoidæ*; gen. Bournonites, Emplectites.

Tribe 4. *Pyritoidæ*; gen. Pyrites, Pyritinus.

Tribe 5. *Smaltoidæ*; gen. Smaltites, Algodonites.

Tribe 6. *Arsenopyritoidæ*; gen. Arsenopyrites.

##### Suborder B. SPATOMETALLINEA.

Tribe 7. *Spatometalloideæ*; (Non-metallic Sulphur, Selenium, Phosphorus).

Tribe 8. *Sphaleroidæ*; gen. Sphalerites.

Tribe 9. *Proustoidæ*; gen. Pyrargyrites, Tennantites.

The *Metalloideæ*, including alike the native metals and those artificially got, present great differences of hardness and density, as well as in the value of  $v$  and in other characters, and must be grouped in several genera or subgenera. The *Galenoidæ* are conveniently divided into three subtribes of sulphids, selenids and tellurids. The first or *Thiogalenoideæ* ( $H = 2 - 3 : v = 7 - 8$ ) embracing the native sulphids of silver, lead and copper, together with argyrodite, metacinnabar, stibnite and bismutite ( $H = 2 - 3 : v = 7 - 8$ ) includes the typical genus, Thionites. The second or *Selenogalenoideæ* ( $H = 2 - 3 : v = 8 - 9.5$ ) embraces the various selenids of silver, lead, copper, mercury, etc., of which eucairite may be taken as a type. The third or *Tellurogalenoideæ* includes the genus *Tellurites*, comprising the tellurids of silver, gold, lead, mercury, bismuth and nickel ( $H = 2.5 - 3.5 : v = 9.5 - 10.5$ ). The soft, flexible, foliated sulphids like sternbergite, argyropyrite, friesite, covellite and molybdenite may constitute a second genus of the first subtribe, with the name of Thiophyllites; and tetradymite and nagyagite may form another genus, Tellurophyllites.

The tribe *Bournonoidæ* includes the large genus Bournonites ( $H = 2 - 3.5 : v = 7.5 - 8$ ) consisting of double sulphids of antimony with lead, silver and copper, of which bournonite is a familiar example. The species of this genus present instructive examples of progressive series, especially those represented by  $\text{Sb}_2\text{S}_3 \cdot n\text{PbS}$ ; in which  $n$  has values of 1, 2, 3, 4, 5, 6, and in a related species, of 12. The large group of double sulphids of



bismuth, having similar values for  $H$  and  $v$ , of which emplectite may be taken as an example, constitutes the genus *Emplectites*.

The *Pyritoideæ* include two principal genera; Pyrites ( $H = 5.5 - 6.5 : v = 4 - 4.5$ ), comprising sulphids of iron, cobalt, nickel, copper, chromium and ruthenium; and Pyritinus ( $H = 3.5 - 4.0 : v = 4.7 - 5.5$ ), also of sulphids of iron, nickel, copper, with manganese and tin.

The tribe *Smaltoideæ*, embracing various arsenids and antimonids, includes the genus Smaltites ( $H = 5 - 6 : v = 4.5 - 5.5$ ) made up of arsenids of iron, nickel and cobalt, of which leucopyrite and smaltite are types, while the antimonial species, breithauptite is closely related. The arsenids of copper, with less hardness and a higher value of  $v$ , will form another genus, Algodonites, near to which is the antimonid of copper, horsfordite, and the antimonial silver, dyscrasite.

The *Arsenopyritoideæ* include the genus Arsenopyrites ( $H = 5 - 6 : v = 4.5 - 5.5$ ), embracing the double sulphids of arsenic, with iron, cobalt and nickel, of which mispickel or arsenopyrite is a type. Closely related thereto are the double sulphids including antimony and bismuth, of which ullmannite, corynite, alloclasite and grunauite are examples.

In the SPATOMETALLINEÆ are comprised various forms of sulphur, selenium and phosphorus. The *Sphaleroideæ* include the genus Sphalerites, ( $H = 2.5 - 4.0 : v = 6 - 7$ ) embracing sphalerite, wurtzite, greenockite, hauerite, oldhamite, cinnabar, and the arsenical sulphids, realgar and orpiment. Here also probably belongs the red antimonie sulphid. The *Proustoideæ* include the genus Pyrargyrites ( $H = 2 - 3 : v = 8 - 9$ ) in which we place both arsenical and antimonial red silver ores—proustite, pyrargyrite, miargyrite, polybasite, etc. In this tribe also is placed Tennantites ( $H = 3.5 - 4.5 : v = 6.5 - 7.5$ ) including the various species of fahlerz, with binnite, dufrénoysite, livingstonite, etc.

The hardness ( $H$ ) and the values of  $v$  have here been given approximately. The paper presented includes all the species of this order, together with tables giving the chemical formulæ, crystalline forms, hardness, specific gravity, and the calculated value of  $p$  and  $v$ , besides a binomial Latin nomenclature, of which examples were given.

2.—*Révision des Éléments de Géométrie d'Euclide.*

Par C. BAILLARGÉ.

( Lu le 24 mai 1888. )

L'auteur expose que l'enseignement de la géométrie élémentaire d'après Euclide est inutilement compliqué de définitions et de démonstrations dont l'utilité est douteuse. D'après lui, beaucoup de propositions se conçoivent mieux sur leur simple énoncé ou comme axiomes, que par de longues démonstrations.

Prenant pour exemple les définitions de la ligne droite, de l'angle de deux lignes et certains théorèmes élémentaires, il prouve qu'il serait facile de simplifier cette partie de la géométrie en supprimant nombre de démonstrations.

Il passe ensuite à l'étude des lignes parallèles, rendue difficile par des objections qui n'ont pu être soulevées que par des sophistes obstinés.

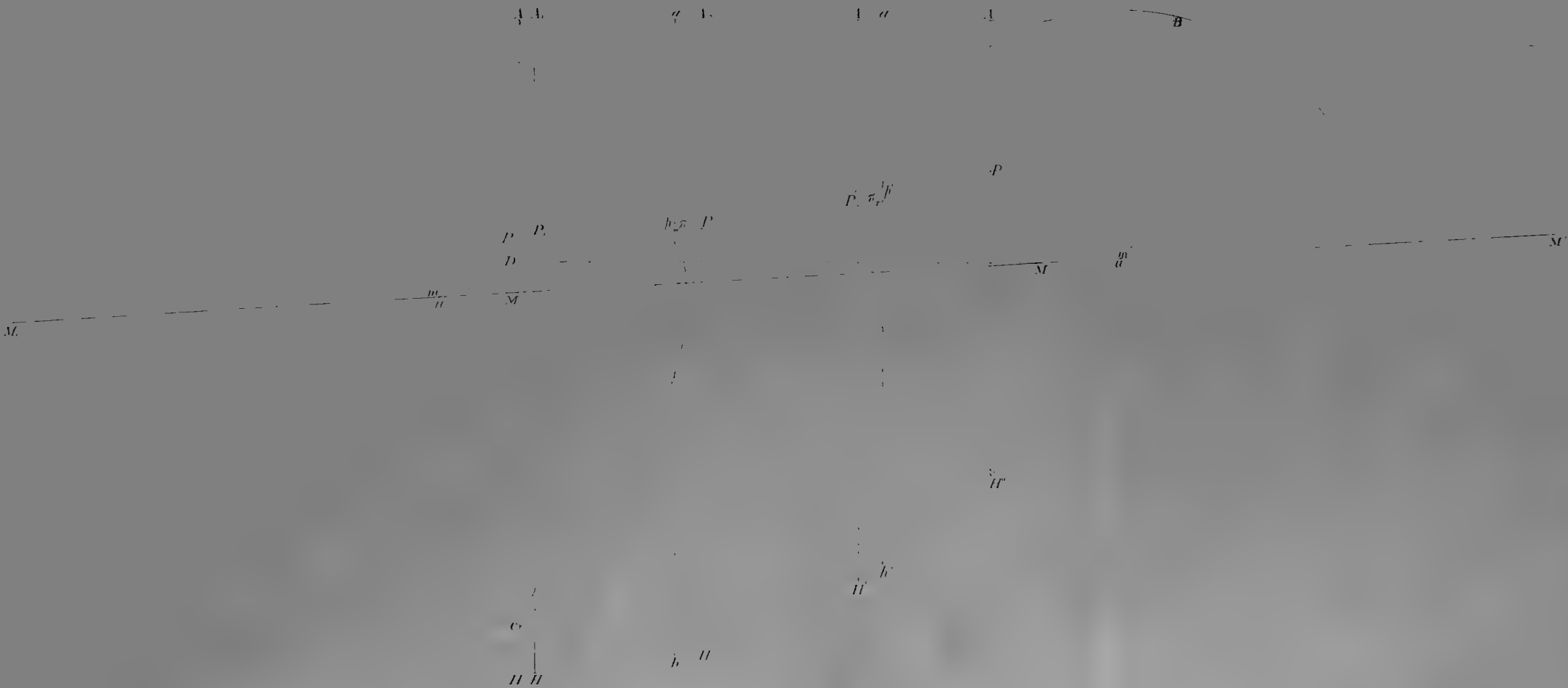
Selon lui, on devrait employer plus souvent la méthode de superposition pour les théorèmes concernant les triangles. Ce procédé est rigoureux et satisfait l'esprit.

Tout énoncé géométrique devrait contenir entre parenthèses les lettres de la figure à laquelle il se rapporte, afin d'en permettre la lecture, à *l'abstrait* en supprimant les lettres ; *au concret*, en les lisant. Il faudrait aussi essayer de simplifier ces énoncés en employant seulement une lettre pour désigner un angle et peut-être un triangle.

On pourrait aussi condenser les démonstrations en réunissant plusieurs théorèmes en un seul ; quelques exemples en sont donnés.

C'est en s'appuyant sur les considérations qui précèdent que l'auteur a composé de nouveau le premier livre des Éléments d'Euclide. Ce travail a été fait pour démontrer que les simplifications suggérées sont parfaitement pratiques et exactes.

L'auteur termine en recommandant aux géomètres anglais, dans l'intérêt de l'éducation, d'entreprendre résolument la révision des Éléments d'Euclide en se guidant sur les considérations qui ont été exposées.



To illustrate Mr. W. F. King's paper on Occultations of Fixed Stars by the Moon.



ROYAL SOCIETY OF CANADA.

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TRANSACTIONS

SECTION IV.

GEOLOGICAL AND BIOLOGICAL SCIENCES.

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PAPERS FOR 1888.



I.—*Presidential Address : The Huronian System in Canada.*

By ROBERT BELL, B. A. SC., M. D., LL.D.

(Read May 22, 1888.)

At the present time, geologists are taking an unusual interest in the study of the Archæan rocks. In America this is especially the case with regard to the Huronian System. It has occurred to me, therefore, that I could not do better than to select this subject for the present address, particularly, as I have devoted much time to its study, both in the field and the office. Among recent authorities, Prof. R. D. Irving, of the United States Geological Survey, has written several valuable papers, and much credit is due to him for the attention he has given to some of the unsettled problems in connection with these rocks. While I agree with much of what he says, I hope he will pardon me for stating plainly my objections to his views on other points.

In order to understand my meaning, it will be necessary to go back for a few moments to what may appear to be elementary definitions, with which Canadian geologists may be supposed to be already familiar. In Canada, especially north of the Great Lakes, and in those States of the Union in which Prof. Irving has worked, there is a great series of rocks above the Laurentian and below the Cambrian which, for more than thirty years has been known to the Canadian Geological Survey as the Huronian System—sometimes also called the Huronian Series. The lower portions of these rocks consist largely of greenstones, conglomerates, and crystalline schists in great variety, characterized for the most part by dark greenish and grey colors, forming a striking contrast to the reddish and lighter greys of the Laurentian gneisses; while in the upper portions, in addition to such rocks, quartzites, greywackes, or volcanic ashes, and clay-slates are also to be found in some regions. Among the rocks of minor volume, which are met with in various parts of the series, may be mentioned limestones and dolomites, iron ores, hornblende rock, jasper and chert rocks, sometimes brecciated, a peculiar jasper conglomerate, serpentine, carbonaceous or plumbaginous slates, imperfect gneisses, breccias and amygdaloids. Granites and syenites, form considerable masses in the midst of the Huronian areas and constitute an important feature in connection with these rocks.

The most extensive Huronian areas yet known are the one whose centre lies between Lake Huron and James Bay, and another on the north-west side of Hudson Bay, of which, however, little is yet known, except what can be gathered from a visit paid to one part of it by myself, but more particularly from several collections of its rocks which have been sent me, showing that it is of very wide geographical extent, and that it embraces a great variety of interesting rocks. The Huronian is also well developed on both sides of Lake Superior, and similar strata occur in the Eastern Townships and in Newfoundland. It is possible also that some of the less altered of the crystalline rocks

of Eastern Ontario, such as those in the counties of Hastings, Lanark, etc., may be best correlated with this system.

The Huronian may be considered as preëminently the metalliferous system of Canada, and of the Northern States east of the Rocky Mountains.

The green and grey schists and "slate conglomerates" prevail towards the bottom, and the quartzites, greywackes and clay-slates are mostly developed towards the top. The Huronian System, as a whole, is conformable to the Laurentian, although some of the upper beds may be locally unconformable to some of the lower ones belonging to the same system, or to the Laurentian, but singularly enough, no instance of the latter kind has yet been observed in Canada. It has a great thickness—probably much greater than has hitherto been attributed to it—amounting, perhaps, to forty or fifty thousand feet. The deposition of so vast a thickness of strata would, of course, imply the lapse of an immense period of time, during which great changes took place. The older members would have time to become consolidated, disturbed and eroded before the formation of the newer, which would necessarily be, to some extent, made up of the debris of the former. Hence, local discordances may naturally be looked for. Rocks of such ancient date, whether stratified or otherwise, must have undergone structural and other changes too profound for us to trace, and hence their original state, compared with their present condition, can often be only conjectured. In cases where a want of conformity originally existed, the strata may have been squeezed into an apparently conformable arrangement; and again, an apparent want of conformity, if such should be found, may have been the result of foldings and dislocations. We should not, therefore, lay too much stress on questions of this nature. My present purpose is to inquire whether the rocks referred to are important enough and sufficiently well defined, as to internal characters and as to position in the geological scale, to retain their place as a system, equivalent to Cambrian, Silurian, etc., and whether it is desirable in the interests of geological science to divide them, and if so, whether such divisions can be well established and defined.

In the "Geology of Canada," 1863, Sir William Logan describes fully what is meant by the term "Huronian." Notwithstanding this, Prof. Irving now defines it to be something else, and attempts, without, I think, sufficient reason, to divide it into two parts, retaining the name for only some of the upper members, and reducing the series to the rank of a mere group. What he proposes to do with the rest of Logan's Huronian is not made clear. For a short definition he calls the Huronian "a detrital, iron-bearing series." If any single feature were to be selected as the most characteristic of the Huronian, I should say it is the igneous origin of so large a proportion of its members, rather than the circumstance that it contains ores of iron.

The fact that the green schist portions of the series on Lake Superior, for example, are not precisely of the same horizon as the Lake Huron quartzites, was never disputed by us. On the contrary, it has always been admitted that a vast system like the Huronian must have a beginning and an end—a top and a bottom—and in the Geological Survey we have always been in the habit of talking of the Upper and Lower Huronian. I have done so with Dr. Selwyn for fifteen years. At the same time we did not consider that we had yet arrived at a sufficiently precise knowledge of these rocks, to be able to draw up exact descriptions of what their subdivisions should be—and this notwithstanding that we have been at work on them for some forty-five years, and over an area equal to about



one half of the United States. If any authority is yet sufficient to describe accurately the Huronian System, it should be the Canadian Survey, but there is no necessity for hurrying to conclusions in advance of sufficient facts. Science is not aided by premature speculations and classifications. They only involve loss of time over arguments which are afterwards found to have been wholly unnecessary when more facts have been obtained. Our reports on these subjects have never been theoretical. They have endeavoured to state the facts ascertained from year to year, and then stopped.

In an interesting paper, published in the *American Journal of Science* for September, October and November, 1887, Prof. Irving says, the term Huronian "is not made to apply specially to any one individual or typical area, but to embrace vaguely defined series of rocks occurring in various wholly separated areas on Lakes Superior and Huron, which series may or may not be, geologically, equivalents of one another, so far as any evidence presented goes to show." This, therefore, disposes of the argument that there is a "typical Huronian" and admits that Logan did apply the term to areas of rocks on Lake Superior; but of this no question could exist in the mind of anyone who reads what Logan says on the subject in the "Geology of Canada," where the descriptions are as clear as language can make them. The argument that there may be a doubt as to the exact equivalency of the different members has no force or value. The Huronian was made comprehensive enough to include them all, and did expressly include them. The term was never meant to be restricted to a very limited set of rocks, as is now attempted to be done, or to a small formation or area. Is there always an absolute certainty that crystalline rocks in any two separate areas are stratigraphically or chronologically equivalent? Questions of equivalency in such rocks can only be determined absolutely by a perfect knowledge of the stratigraphy, and that in contiguous regions, and yet, even then, how many accidents and strange or unlooked-for phenomena may intervene to puzzle us, as witness the case of the rocks of the Eastern Townships of the province of Quebec.

The description of the Huronian system in the "Geology of Canada" required to be brief, and it could not enter into tedious details or arguments. It had to be accepted on the supposition that the author knew more than he stated there, and had good reasons for all he said. "Is there a Huronian Group?" is the title of Prof. Irving's paper above referred to. This seems a strange question to ask at this date, and one might suppose the inquirer had yet to learn what had been done by the Canadian Survey during the last forty-five years—unless indeed his question applies merely to the word "group." In the latter case I should say, "No." But if the question refers to the existence or otherwise of a great set of rocks, to which the name Huronian should apply, and which have been so long recognised as the Huronian System, then I answer, "Yes." Prof. Irving says: "If then we seek—as we must do—for a type series with which to start a study of the so-called Huronian, we can find it only in this Lake Huron series." Why, I ask? Logan, Murray or Hunt, the founders of the system, never said so. They left us just as free to set up the prevailing Lake Superior variety of these rocks as our type, if we are to be allowed at all to separate, thus arbitrarily, any one portion and imagine it to be the "typical Huronian"; instead of continuing to call the whole set Huronian, as we should if we follow those who originally defined what the Huronian is.

I must here pause for a moment to protest against the use of two terms which have lately become too fashionable among beginners in this subject, namely, the words

"typical" and "so-called." A set of rocks does not become typical of anything but itself, simply because some one chooses to say it is so; and the term "so-called," with which some geological controversies are so thick interlarded, is unnecessary and disrespectful to those from whom authors may see fit to differ.

The misconceptions which grow out of Prof. Irving's arguments, in the paper referred to, are largely due to his starting on wrong premises. He fights a phantom. He insists on defining his own ideal type as that which should be the Huronian, instead of accepting the definition of the system which had been well established for thirty years before he began his work, and then endeavours to demolish every view which may not agree with his own. I do not propose to try to controvert any facts which he may state, but only what appear to me to be misconceptions, and I think if he were to give the whole subject an impartial consideration, regardless of any theories whatever, there would be no great disagreement between us.

The north shore of Lake Huron is so easily accessible, compared with the vast regions into which the Huronian rocks extend northward and elsewhere, that the rocks of the the classes under discussion were most easily studied there at the time when the first attempts were being made to obtain a knowledge of the geology of Upper Canada, and owing to the still greater facilities which now exist for reaching this district, it continues to be the ground most visited by geologists who have interested themselves in these rocks. Great stress is laid by such visitors on matters of small local detail, which they happen to observe there, and on unimportant circumstances which are of almost no account, when we look at the vast extent and thickness of these rocks and take a broad view of the whole question.

The comparatively undisturbed or little folded condition, which is sometimes observed near Lake Huron and elsewhere, is not the rule in the Huronian strata, but is confined to limited districts; and instances of similar areas may occasionally be found among the Laurentian gneisses which are generally so much contorted. The rocks originally described by Murray, in the Reports of Progress of the Survey (whose descriptions were afterwards condensed by Logan in the "Geology of Canada"), near the north shore of Lake Huron, and which have been selected by Prof. Irving as what he thinks should be the type of the Huronian System, happen to be comparatively little disturbed in some parts of this district, but the same rocks are elsewhere highly inclined. In fact this is the rule even in the "typical" Huronian area. The examinations of Murray only extended to an average distance of about ten miles inland from the north shore of Lake Huron; while those of the writer, who by the way, worked with Murray in this region, have since extended by degrees to about fifteen hundred miles in the same direction. Murray paid most attention to the rocks which formed ridges, or were from any cause conspicuous; quartzites and "slate-conglomerates" were his favorites. He does not even mention numerous varieties of rocks which exist in the district he mapped out. As a matter of fact, crystalline schists, such as those which prevail among the Huronian rocks of Lake Superior, are largely associated with the quartzites and slate-conglomerates of the Lake Huron region. The intrusions of greenstones or diabases which form prominent hills and bluffs and obtrude themselves along rivers, received a good deal of attention, but the greywackes or volcanic ashes, which are much more extensive, but generally occupy lower ground, are scarcely referred to.

"But it remains to be considered," says the author I have already quoted, "whether there is equally strong warrant for considering this series to be structurally and consequently chronologically separable from the adjoining portions of the so-called Archæan. Is it not possible that we are merely setting off arbitrarily a set of rocks, which is really only part and parcel of the whole great Archæan complex, and is not separable by any genuine line of demarcation?" I agree with Prof. Irving that we are setting off what is really part of the Archæan, but I think the general distinctness of the Huronian is sufficient to justify the division, and that the difference between the two sets of rocks—Huronian and Laurentian—is great enough and easy enough of recognition to justify the separation. Why do we draw lines anywhere in the geological scale? Is it not for the convenience of description and the classification of our facts, in order that we may the better fix our ideas? Our present systems among the higher rocks might have been made more comprehensive; and Murchison, for example, wished to make his Silurian System include nearly the whole of the Palæozoic rocks. Nothing would be gained by including the Laurentian and Huronian under one system. On the contrary, there is great convenience and utility in retaining these appropriate and well-established divisions; but it will be difficult, on general principles, to justify a further division of the Huronian as it has hitherto been recognised by the Canadian Survey. While the Huronian, as thus defined, forms a natural division which can be easily separated from the Laurentian, it is impossible to practically draw the line between the crystalline schists and the quartzite portions, even if it were desirable to do so, which it is not. Why should we, therefore, seek to establish a division which it is admitted cannot be defined either on a geological map or by description. If we look at a geological map showing the known Huronian belts or areas all over the continent, we shall see that they occupy everywhere the same place in regard to the Laurentian, and that it is manifestly unjustifiable in the present state of our knowledge to pick out any one or a part of any one of them and call it a natural geological division, recognisable as distinct from all the rest. Although the Huronian rocks are conformable to the Laurentian, as a whole, and might, therefore, be regarded as a continuation of the latter, still, as already remarked, their general character is so different and so easily distinguished that they constitute a sufficiently well defined set, and the more we know about them, the more useful and natural does this separation appear. The lines between other systems of rocks are not always drawn at great physical breaks, and why should we insist on one here before recognising the Huronian as entitled to rank as a system? On the other hand, a local discordance between two of its members, or the fact that some of the higher ones contain fragments of some of the lower, would not constitute a sufficient reason to place these different members in separate geological divisions of important rank in the scale of classification. The upper members of any series are apt to contain fragments of the lower, and this sometimes within comparatively narrow limits, such as those included under the term "formation."

In his descriptions of the Huronian, Prof. Irving does not give sufficient prominence to the igneous nature of a large proportion of the system, but, as already stated, rather conveys the impression that its great feature is its iron-bearing character. The second part of this author's paper, under the above title, begins with the declaration that "deciding that the type Huronian is a true group, is a different matter from concluding that all rocks which have been called Huronian in other regions are the geological equi-

valents of the type series." It has not been asserted that all Huronian rocks are the equivalents of the particular part of the system which Prof. Irving calls "the type series," nor is it necessary that they should be, in order that they be still Huronian. He goes on to say that "with most, if not all, of those who have attempted those distant correlations, there has prevailed a most singular misapprehension as to the real nature of the type or original series," forgetting all the time that the crystalline schists were originally defined to be as typical of the Huronian as the quartzite portions which he has set apart as the type. He appears to assume that he alone can be right in this matter, and that all other geologists are wrong, including the founders of the system. "For this misconception," he says, "Dr. T. S. Hunt seems mainly to be responsible." I do not see that Dr. Hunt has much to apologize for in this regard. It was he who first gave the name Huronian, and he probably knows what he intended that name to mean. After denying that the Huronian of the north shore of Lake Superior can be correlated with that of the north shore of Lake Huron, Prof. Irving presumes that the latter is nevertheless connected in some way with the Huronian of Marquette, etc., on the south shore of Lake Superior. He says :—"There is good reason to believe that in the region which stretches from the north shore of Lake Huron to the Mississippi River, we are dealing with one geological basin, so far as the rocks which I take to be the equivalents of the type Huronian are concerned ; in other words, there is good reason to believe that all of these areas were once connected, the connections having been removed by erosion." But why this basin should have shown a preference for United States territory at that early period of the earth's history is not pointed out. It would appear that the rocks of the same geological basin on the British side of Lake Superior were expressly excluded, although naturally belonging to it. Moreover the Huronian rocks of the south shore of Lake Superior are separated by a great interval of newer strata from those of the north shore of Lake Huron, and there is not a particle of evidence to show that they are connected with one another any more than either of them may be with Huronian areas in other directions.

In 1859, I visited the Marquette region in company with Mr. Murray of the Canadian Survey, and again alone in 1886, and both of us considered them to be essentially the same as the Huronian of the Canadian side of the great lakes. They resemble more closely the varieties of Huronian rocks which prevail on the north side of Lake Superior than those met with to the north of Lake Huron. The granites and syenites are found cutting, or at all events lying in the midst of, both the schistose and the quartzose portions of the Huronian. In my various reports on the subject, I have shown that the commonest positions of these rocks is towards the edges of the Huronian areas. It is a remarkable fact that in the conglomerates of all parts of the Huronian System, both geographically and stratigraphically, pebbles and boulders of granite and syenite of all shades of red and grey are very abundant, while those of gneiss are either scarce or altogether absent. Prof. Irving speaks of "basal conglomerates" as if rocks of this kind began at one known horizon which separates his Huronian from the crystalline schists, and which he supposes lie entirely below it. This, however, is not the case. On the contrary, they are found interstratified with the schistose, as well as the more massive portions and at all horizons of the series. Among the more southern of the Canadian Huronian areas, for example, they are described in our reports as abundant in those of Michipicoten, the Pic, Lake of the Woods, and Red Lake. The finest examples of ordinary

shore conglomerates which I have anywhere seen among Huronian rocks are those associated with crystalline schists, etc., at Red Lake, lying north-eastward of Lake of the Woods.

The geologist whom I have already or often quoted, contends that in northern Michigan, the Huronian rocks may be divided into two distinct classes similar to those which he would establish on the Canadian side of the lakes notwithstanding the "one geological basin" above referred to. "The proofs of this distinctness," he says, "are analogous to those which establish the separations of the type Huronian of Lake Huron from the adjoining crystalline schists, viz.:—(1) a general lithological contrast between the two series concerned, the one being mainly but little altered, the other highly crystalline and schistose; (2) visible discordances in a few places on the contacts of the two sets of rocks; (3) the penetration of the lower strata by granite veins and masses which fail to penetrate the higher detrital rocks, but on the contrary have yielded fragments to them; (4) the development of true basal conglomerates at the contacts of the two series; and (5) the fact that the detrital rocks are in contact with different members of the lower series." The fifth of these arguments appears to be merely a repetition of the second. After laying down these "proofs" of the distinctness contended for, Prof. Irving admits that most of them are very doubtful. For example, he says:—"Nevertheless there are presented here some differences from the conditions observable on the north shore of Lake Huron, which seem to obscure the true relations of the different rocks. The placing together of all the stratiform rocks of the Marquette belt by most geologists is not at all to be wondered at," etc. "Thus the evidence under the first of the heads just named is in part obscured," etc. "A more important obscuration of original conditions applies to the evidence under the second head." "This apparent obliteration of unconformity is yet more marked in some of the districts subsequently to be noted. To render the case still more difficult of comprehension, the denudation which has so deeply truncated the region, has occasionally brought to light within the area occupied by the newer detrital strata, patches of the older schistose basement," etc.

We see here a laboured effort to show that although appearances and conditions or, rather let us say, facts, are all against the supposition that there are two distinct sets of rocks, and in favour of the old view that the rocks of his "typical Huronian" and the crystalline schists constitute but one system, yet, notwithstanding all this evidence of both positive and negative character, we are to come to an opposite conclusion—that "things are not what they seem," as it were, so far as the Huronian rocks are concerned. In the third part of the paper referred to, the author concludes that "there must be cases, however, where it will long remain very difficult, if not impossible, to separate the Huronian from the older schists, or to determine if any Huronian be present." It does not appear to have occurred to Prof. Irving that by far the simplest explanation of the whole matter is to admit what is manifest, namely, that these rocks are really what they seem to be—all one series—the Huronian, as it has always been described by the Geological Survey of Canada.

I would not, however, deny, as I have said already, that it may some day be possible to define certain divisions which it may be desirable to make hereafter, but I think it advisable to wait till we shall have accumulated more facts. It is likely that, locally, at any rate, we may be able to draw a line between the Upper and Lower Huronian, and that these

divisions may become recognised as two separate series, subordinate to the Huronian System, which should retain the name as a whole; but I do not think it would ever be desirable, even if it should prove possible, to form out of these rocks a new system of equal rank with the Huronian. It would be equally undesirable to attempt to introduce a new name to take the place of one so well established, so appropriate and so universally recognised. Still, we are indebted to Prof. Irving for having called attention to the question, and his criticisms will, no doubt, stimulate fresh research in this direction.

In regard to the correlation of the Huronian and the Animikie, I am not aware if Prof. Irving still holds the view that they form parts of one series. Around Thunder Bay the Animikie rocks are certainly very different in almost every respect from the Huronian, as there described under that name by Logan, and they rest on the almost vertical denuded edges of the latter, nearly horizontally. This subject was very ably dealt with by Mr. Peter McKellar, in a paper read at our last meeting and published in the volume of Transactions which has since been issued. I need not, therefore, occupy further space with this question.

I should like, however, to call your attention to a few points in connection with the relations of the Huronian to other rocks which have not yet been recognised as forming parts of it, and which haven't hitherto been much discussed. On the east coast of Hudson Bay at Little Whale River and Richmond Gulf may be seen a great thickness of hard, grey and red conglomerates, in which rounded pebbles of white quartz are conspicuous, associated with hard red and grey sandstone. Similar rocks are also largely developed in the eastern part of Lake Athabasca and on the north arm of Great Slave Lake. They are also said to occur on the upper part of the Clearwater River. On the east side of Hudson Bay, these conglomerates and sandstones clearly lie between the Manitounuck (believed to be the equivalent of the Animikie) and the Laurentian, and in one place green rocks, like Huronian, appear to intervene between them.

Under the microscope, the Huronian greywackes of Lakes Temiscaming and Temagami, and the country thence to Lake Huron, bear a strong resemblance to those which form so large a proportion of the boulders and pebbles of the drift around and south-westward of Hudson Bay and James Bay, and a similar rock appears to occur *in situ* on Long Island, off Cape Jones. From the abundance of these pebbles and boulders all around James Bay, and especially to the west of it and considering the immense extent of country over which they are spread in that direction, there appears to be little doubt, that the formation from which they have been derived is largely developed under the waters of the bay. A somewhat similar rock, which also resembles the gold-bearing "whinstone" of Nova Scotia, is met with dipping at considerable angles at the mouth of Churchill River and along the coast in the neighborhood.

The present controversy as to the Huronian rocks and the proposal to separate a part of the system from the main body, is largely due to the fact that the locally developed quartzites happen to be so conspicuous in the easily accessible region on the north shore of Lake Huron. But it must be remembered that similar quartzites are found in this system in many other regions. The white quartzites of Marble Island, which are at least as conspicuous as any of those near Lake Huron, are associated with dark, hydro-mica schists; and similar rocks are reported as abundant far into the interior on the north-west side of Hudson Bay. West of Lake Superior, grey quartzites are found along the international

boundary line in the Thunder Bay district, and again on Brushy Creek, north of Seine River. (See report by the writer in the Reports of Progress of the Geol. Survey for 1872). Grey quartzites occur in considerable volume in a Huronian belt on Missinaibi River. (Geol. Survey Report for 1875). Around the northern part of Temagami Lake, and between it and Montreal River, as well as along that stream, light grey, reddish and greenish-grey quartzites are met with. On Lake Temiscaming, a greenish-grey variety is largely developed. The late Mr. Walter McOuat stated that an isolated mountain which he examined on the height-of-land just west of the canoe-route between Lakes Temiscaming and Abitibi, consisted entirely of quartzite, and that the same rock occurred on the point in the latter lake, on which the Hudson's Bay Company's post is built. (Report of the Geol. Survey for 1871-2, p. 129). Mr. E. B. Borron, informs me that in going westward from the above mountain last summer, he found a continuation of the quartzite in the direction of Frederick River. White quartzite occurs at Red Lake among various other Huronian rocks resembling those of Lake Huron, which are there associated with schists of the Lake Superior type. (Summary Report of the Geol. Survey for 1883.) Quartzite with iron ore is found near the Huronian Mine west of Thunder Bay. The existence of white quartzites on Goulais and Batchawana Bays on Lake Superior has been already referred to.

Some of the Huronian quartzites might be described as sandstones, but most of them are hard and close-grained and even vitreous in appearance on fresh fracture. They are characterised by holding grains of felspar more or less thickly disseminated through them. On exposed surfaces, these grains weather out, and sometimes give them a finely pitted appearance. The almost constant presence of these felspar grains is of interest in connection with the origin of the quartzites. The felspar grains often become so abundant as to constitute a greywacke. Sometimes one part of a bed will consist almost entirely of quartz grains, while in another part, felspar predominates, there being a more or less distinct passage of the one into the other. Indeed the origin or formation of the quartzites appears to have been connected with that of the greywackes, which are on the whole more largely developed than the former. The latter are very frequently associated with stratified quartz diorites; and from this circumstance, as well as from their microscopic characters, they would appear to be of volcanic origin. Thus, even the quartzites would seem to partake of the general igneous nature of the system of rocks to which they belong. Some beds of the white and grey quartzites, especially on the east side of Lake Superior, and north of the Bruce Mines on Lake Huron, contain small red jasper pebbles thickly diffused. They are mostly longitudinally banded and resemble the jasper in the thin beds alternating with equally thin beds of iron ore found lower down in the series in some localities, a good example being that described by myself as occurring on the east side of the Kaministiquia River, just below the crossing of the Dawson Road. (Geol. Survey Reports for 1869). Some of the other rocks, such as the limestones, serpentines, steatites, argillites and plumbaginous schists are, like the quartzites, irregularly or locally distributed in the Huronian Series. But the presence or absence of any one or more of these members in a given district can scarcely be held as a reason for separating the rocks of such a district into a distinct series. The varying proportion in which the different sorts of rocks occur in the different Huronian areas is to be considered as a difference in degree only and not in kind, affecting the whole system.



Of late years, some geologists have manifested a great desire to make out a want of conformity between the Huronian and Laurentian Systems, and in the absence of any facts as yet discovered in Canada to prove such an assumption, they eagerly seize upon any expression to be found in the reports of the older investigators which appears to favour it. The only circumstance, as far as I am aware, which seems to point in this direction is a section in the Atlas accompanying the "Geology of Canada" (1863), in which contorted gneiss is shown under the contact of the Huronian rocks. But this representation of the general contorted character of the Laurentian and which may be largely due to the artist, does not justify the notion of a want of conformity, and, even if it did, we should still prefer to appeal to nature for our evidence. Under a note on the "Contact of Laurentian and Huronian rocks," Logan in the "Geology of Canada" (p. 64) says distinctly that they are conformable. Some of those who favor the theory of unconformability, find evidence in the fact that some parts of the Huronian contain fragments of older rocks. But in any geological formation, we might naturally look for the debris of any other older than itself, and this too without proving want of conformity. In any of the Huronian conglomerates we might have expected to find abundance of pebbles of gneiss, but, strangely enough, such pebbles are very rare, while those of other members of the Huronian series itself and of various kinds of granite and syenite, like those occurring *in situ* within the Huronian areas, are quite abundant.

The fact that bands of imperfect gneisses and gneissoid strata are occasionally to be found among the Huronian rocks, might be considered a reason in favor of classifying them with the Laurentian, the greater part of which is gneiss, or against recognising them as a separate division of the Archæan. Gneisses, however, are not conspicuous—indeed, they are of rare occurrence in the Huronian, and always appear to present points of difference sufficient, along with the stratigraphy, to distinguish them from those of the Laurentian system. They are generally "imperfect" or more finely-grained, and less completely crystalline than the latter. Another point of difference I have observed, is, that they are slightly calcareous in all the numerous cases which I have tried, while the Laurentian gneisses rarely contain carbonate of lime. In the few examples which I have noticed of more coarsely crystalline bands of gneissoid rocks in the Huronian, the felspar, or a considerable part of it, has been of triclinic species.

The Huronian is the great metalliferous system of Canada, especially if we consider the Hastings Series, and the altered rocks of the Eastern Townships as belonging to it. The presence of gold has been detected in many localities, and it appears to occur in promising quantities at Jackfish Bay, at the Huronian Mine and elsewhere to the west of Thunder Bay, and in the Township of Denison north of Lake Huron. Small quantities of silver have been found by assay in veinstones from numerous places, and in larger amount at the 3 A Mine on Thunder Bay. The sulphurets of copper are very generally diffused among these rocks, especially in the diorites and some of the schists. They have been worked at the Bruce and Wellington Mines and recently at several localities near Sudbury. Trials on a smaller scale have been made at various other places. But iron is the metal for which these rocks are more especially noted. The great iron mines of the Marquette district on the south side of Lake Superior are well known. In Canada, west of Lake Superior and between the great lakes and Hudson Bay, iron ores in notable quantities have been found at the following among other localities:—Knee Lake, between



Lake Winnipeg and York Factory, Albany River near the junction of the Etow-i-mami, east of Wabigoon Lake, Atik-Okan, or Antler River, west of Lac des Mille Lacs, Slate Islands, Gros Cap near Michipicoten, north of Batchawana Bay, Quinze Rapids Ottawa River, Opazatika and Abittibi Lakes. Considerable deposits of siliceous iron ore occur at Little Pic River on Lake Superior, but there is reason to suppose that the rocks at this locality are of a different age. In addition to metallic ores, the Huronian System yields other minerals or rocks of economic value, such as roofing slate, building stones and flagstones, serpentine and limestone marbles, ornamental granite and syenite, soapstone, asbestos (chrysotile) quartzite for glass-making, iron pyrites, etc.

While rocks of igneous origin constitute a marked feature in the Huronian System, a large proportion of it is made up of those of an undoubted sedimentary character. On the other hand, it is questionable if the great bulk of the Laurentian rocks can be proved to have been deposited from water. It is supposed by many that the foliation of much of the gneiss may have been produced by pressure and some kind of flowing movement in an igneous mass. Whatever view we may take of the origin of the common Laurentian gneiss, which forms the surface of the country over such a vast extent of the Canadian half of North America, the commencement of the Huronian period marks a great change which then came over the earth—a change characterised by wide-spread volcanic outbursts, and by evidence of the existence of water (perhaps the first) on the surface of the globe, and of certain progress in the building up of the aqueous deposits which has been going on ever since.



II. — *Le Gaz naturel dans la province de Québec,*

Par M. L'ABBÉ LAFLAMME.

( Lu le 23 mai 1888 )

L'existence du gaz naturel dans la province de Québec est connue depuis plus de deux cents ans. Dès les commencements de la colonie, les défricheurs qui s'établirent sur les terres situées dans la partie nord-ouest de cette province, la seule qui renferme de ces gaz, remarquèrent des dégagements gazeux, se faisant jour en différents endroits, surtout dans les sources d'eau minérale.

Plus tard les études de notre commission géologique vinrent confirmer les observations des cultivateurs, et signalèrent plusieurs localités où ces dégagements étaient particulièrement remarquables.

Les nombreux travaux qui se sont faits depuis sur ce sujet dans la Pensylvanie, l'Ohio, la province d'Ontario et ailleurs, ont jeté un nouveau jour sur les accumulations de gaz naturels.

Sauf dans le Missouri, où, jusqu'ici, le gaz naturel semble provenir presque exclusivement de la décomposition des matières organiques du drift, ce gaz, en règle générale, se rencontre dans des assises géologiques plus ou moins anciennes, et résulte d'une décomposition spéciale des matières organiques qui s'y trouvent accumulées. Citons, parmi celles-ci, ces curieuses sporanges que l'on découvre en quantité immense dans certaines couches dévoniennes, et même dans les lits plus anciens, et sur la nature desquelles notre illustre collègue, sir William Dawson, vient de publier une si belle étude dans son dernier ouvrage : *The Geological History of Plants*. C'est peut-être à la présence de ces germes microscopiques en nombre incalculable que certaines couches géologiques doivent en grande partie leur importance économique actuelle.

Le caractère bitumineux de plusieurs des formations géologiques canadiennes n'avait pas échappé à l'observation de nos premiers explorateurs. Dès 1861, croyons-nous, M. le docteur T. S. Hunt affirmait que nos lits calcaires de Trenton pourraient bien un jour ou l'autre donner des sources payantes de pétrole. Plus tard, en 1866, il émettait de nouveau la même opinion, en donnant ce fait comme une éventualité qu'il ne fallait pas perdre de vue. Malheureusement les sondages dispendieux qu'exigent les recherches de cette nature ont toujours fait différer une étude plus approfondie et plus complète de cette question.

Vers l'année 1882, le gouvernement de Québec, sur la prière des citoyens de Louiseville, résolut de faire faire quelques investigations plus précises. A la demande du ministre de l'Agriculture, je me rendis dans cette localité pour examiner un dégagement gazeux abondant qui s'était fait jour sur la propriété d'un nommé Saint-Pierre, à environ deux milles au sud-sud-ouest du village.

On avait creusé un puits d'environ dix pieds carrés d'ouverture, sur huit à dix de profondeur. La cavité était à peu près remplie d'une eau boueuse, toujours vivement agitée par un dégagement abondant de gaz. Tout autour du puits, le sol était criblé d'étroites crevasses par lesquelles le gaz se faisait jour en petite quantité.

Un examen superficiel prouva que, comme dans toutes nos sources salines, ce gaz était constitué presque totalement par du protocarbure d'hydrogène, avec une toute petite quantité d'azote et des traces d'acide carbonique. Le débit journalier de ce puits était d'environ 2,000 pieds cubes, autant qu'il fut possible de s'en assurer alors en notant le temps nécessaire pour remplir un gazomètre de capacité connue.

Le résultat pratique de cette exploration, qu'on ne voulut pas d'ailleurs pousser plus loin, ne pouvait être que très pauvre. Aussi, au bout de quelques mois, toute idée de recherches sérieuses semblait être à peu près abandonnée. Les travaux qu'on avait parlé de faire en rapport avec le puits Saint-Pierre ne furent jamais commencés, et les choses en restèrent là pour quelques années.

Durant l'été de 1885, sur les encouragements de M. Obalski, ingénieur du gouvernement de Québec, on commença à percer un puits à Saint-Grégoire, au sud du Saint-Laurent. On cherchait cette fois non pas du gaz, mais du pétrole. On voulait arriver au Trenton, dans l'espérance d'y trouver en abondance le précieux liquide. Le caractère bi-

tumineux de ce calcaire avait été alors mis en évidence plus que jamais par certaines observations faites dans le calcaire lui-même à la Pointe-aux-Trembles, près de Québec, et les espérances des mineurs avaient été ainsi ravivées.

Le choix spécial que l'on avait fait de Saint-Grégoire était dû en partie au fait que, sur la ferme d'un M. Trudelle, concession de Beauséjour, on avait observé un dégagement gazeux absolument analogue au puits Saint-Pierre, à Louiseville. On ne croyait pas que le gaz pût ainsi se dégager du sol sans qu'il y eût en-dessous un réservoir de pétrole servant de générateur et de producteur. Il est maintenant acquis qu'il n'y a pas de concomitance nécessaire entre la présence du gaz naturel dans une formation géologique et l'existence de sources payantes de pétrole.

M. Obalski a publié, dans le rapport du commissaire des Terres de la couronne pour l'année 1885, un compte-rendu détaillé du forage qui fut fait alors. Nous avons essayé de le reproduire dans la figure 1. Après avoir traversé 75 pieds de drift, le trépan frappa un grès calcaire, assez tendre à la surface pour être sectile. À 155 pieds, s'est rencontré un schiste généralement rouge qui s'est prolongé jusqu'à la profondeur de 640 pieds, et auquel a succédé, sur une épaisseur de 180 pieds, un calcaire impur, suintant le pétrole. Un schiste noir a commencé ensuite à 820 pieds, pour se continuer jusqu'au fond du puits, à 1,115 pieds.

Cette section paraît avoir été faite par les mineurs eux-mêmes, et l'on sait avec quelle réserve il faut toujours accueillir des données de cette nature. Tant que l'examen des

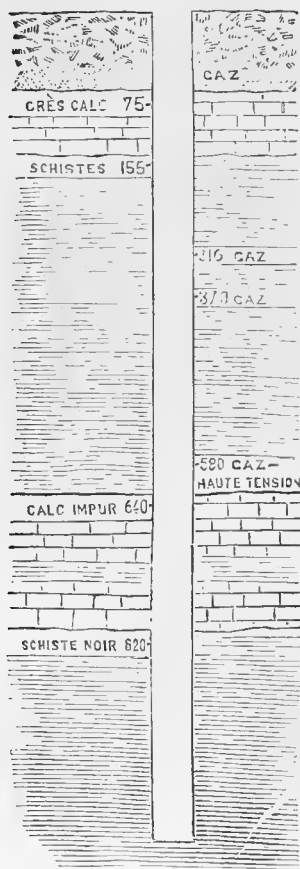


Fig. 1.

échantillons recueillis à différentes profondeurs n'a pas été sérieusement faite, la prudence exige de ne pas trop se fier à la nomenclature minéralogique donnée par les notes des ouvriers.

Une première veine de gaz inodore fut rencontrée dans le drift, une seconde à 316 pieds, une troisième à 370, et une quatrième à forte tension, à 580. La pression de cette dernière fut suffisante, d'après M. Obalski, pour lancer des pierres à une hauteur de soixante pieds, ce qui suppose une vitesse, à l'orifice, d'environ 62 pieds par seconde. La violence de ce dégagement ne s'est pas maintenue, mais, absolument comme dans plusieurs puits percés dans les schistes de l'Ohio, elle est tombée bientôt à une vitesse de sortie relativement très faible. Une autre veine de gaz fut rencontrée à la profondeur de 820 pieds, dans le schiste noir. Chose remarquable, on n'a pas frappé une seule veine d'eau, du moment que l'épaisseur du drift a été traversée. C'est du moins ce que laisse entendre le rapport de M. Obalski. Dans les sondages analogues faits à Maisonneuve et à Louiseville, la présence de l'eau minérale à différents niveaux a constamment été l'un des grands ennuis, et, comme le puits de Saint-Grégoire a été creusé précisément dans les mêmes couches géologiques que ceux de Louiseville, du moins pour la partie inférieure, nous croyons que la section donnée dans le rapport de M. Obalski n'est peut-être pas tout à fait complète; à moins que l'on ne veuille expliquer cette différence par le fait que le puits de Saint-Grégoire n'atteint que la partie supérieure des formations, rivière Hudson et Utica, tandis que celui de Louiseville en traverse les assises les plus profondes.

Les travaux, arrêtés le 20 octobre 1885, n'ont pas été repris depuis. L'ouverture a laissé, durant près de trois ans, sortir un volume de gaz que M. Obalski évalue à 250,000 pieds cubes par jour, ce qui nous paraît bien un peu exagéré. On a essayé à diverses reprises de fermer le tube de sortie en y enfonçant à grands coups de masses de forts bouchons en bois, mais ce système d'obturateur, par trop rudimentaire, n'a pas réussi, et les bouchons n'ont pas pu résister à la pression intérieure du gaz. Cette pression en toute probabilité doit dépasser 200 livres au pouce carré.

Il est vraiment regrettable qu'une quantité très considérable en définitive du meilleur combustible que l'on connaisse se perde ainsi journellement sans que personne ne s'en occupe. On admet en Pensylvanie et dans l'Ohio que 15,000 pieds cubes de gaz peuvent facilement remplacer une tonne de houille dans les applications industrielles. Dans ce cas, en supposant que le débit ne soit, à Saint-Grégoire, que 50,000 pieds cubes par 24 heures, ce qui nous semble beaucoup plus rapproché de la vérité que le chiffre de 250,000, nous arrivons à une perte de plus de 65,000,000 de pieds cubes depuis la date du creusement de ce puits, à peu près l'équivalent de 2,520 tonnes de houille, c'est-à-dire près de 12,000 dollars! Il nous semble qu'une législation destinée à prévenir de semblables gaspillages trouverait ici sa place.

L'année suivante, une compagnie, solidement organisée par une charte du gouvernement de Québec, reprit ces intéressantes recherches, et fit faire, à ses risques et périls, des sondages sérieux à Maisonneuve près de Montréal et à Louiseville. Malheureusement les mineurs qui creusèrent les puits n'avaient pas l'expérience nécessaire pour mener à bonne fin des travaux de ce genre. Ils n'avaient jamais travaillé que dans les régions à pétrole, et de plus nos formations géologiques leur étaient à peu près complètement étrangères. Aussi les forages, n'ayant pas été faits comme ils auraient dû l'être, n'ont pas donné jusqu'ici de résultats satisfaisants.

Malgré tout, l'exploitation de cette richesse minérale semble être entrée définitivement dans une nouvelle phase. Sur la demande de la compagnie dont je viens de parler, M. Ashburner, géologue de la Pensylvanie, très entendu dans ces matières, est venu l'automne dernier faire dans les localités travaillées une exploration générale, et dans le rapport qu'il en a donné on peut voir, paraît-il, à travers quelques obscurités qui lui étaient peut-être imposées par les circonstances, sa croyance à l'existence, du moins dans quelques parties de la province de Québec, de réservoirs importants de gaz naturels. Les travaux d'exploration seront bientôt poussés avec une grande vigueur. On désire savoir définitivement à quoi s'en tenir.

En attendant mieux, voici les résultats déjà obtenus par les sondages faits pendant les années 1886 et 1887.

Nous avons pu, grâce à la bienveillance des directeurs de la compagnie, nous procurer un registre plus ou moins complet de chacun des puits qui ont été percés. Dans certains cas même, des échantillons pris à différentes profondeurs ont été remis entre nos mains. Malheureusement ces échantillons ont été recueillis à des distances régulièrement espacées, et non pas chaque fois que les couches changeaient de nature; de telle façon qu'il a été impossible d'établir rigoureusement l'épaisseur exacte des différentes couches qui ont été traversées. Nous avons dû nous contenter d'une approximation plus ou moins satisfaisante.

Il eût été important de localiser les recherches à faire avec une grande prudence, afin d'éviter toute dépense inutile. Ainsi la détermination des anticlinales et de leur direction eût été un fait capital, vu qu'il est généralement admis que c'est sur le faite de ces plis, là surtout où ils sont traversés par des plis secondaires, que les chances sont le plus favorables.

Mais partout, dans cette partie de la province de Québec, une épaisse couche de drift recouvre complètement tous les affleurements, et rend cette détermination presque impossible. Un certain nombre d'anticlinales sont bien indiqués dans la *Géologie du Canada* de 1863, mais ces données sont encore loin d'être suffisantes. Il n'est pas impossible en effet qu'un pli anticlinal, presque insensible à la surface, ne s'accroisse dans les couches profondes, et ne prenne ainsi une grande importance. C'est le cas, par exemple, de l'anticlinale de Cincinnati, dans les environs de Findlay, Ohio.

De plus, ne peut-il pas arriver que ces anticlinales profondes ne se trahissent aucunement à l'extérieur, et que leur existence ne soit révélée aux géologues que le jour où le trépan du mineur les aura frappées?

C'est peut-être ce qui explique pourquoi les sondages de la compagnie de gaz naturels de Québec semblent avoir été faits un peu au hasard. Ils s'attaquaient à un champ nouveau, dans lequel, comme toujours, l'expérience faite par les mineurs doit avoir le dernier mot.

En règle générale, cependant, les puits d'essai ont toujours été forés dans des endroits où le dégagement superficiel du gaz laissait entrevoir à une certaine profondeur l'existence de ce combustible en plus grande quantité.

Les premiers travaux furent faits à Maisonneuve, près de Montréal, à un endroit où la carte géologique indique le commencement de la formation Utica. C'était se poser bravement en face de l'inconnu. En effet, jusqu'à présent, la formation de Trenton a été regardée comme la plus ancienne des formations pétrolifères. Même, d'après le rapport de

M. E. Orton, il est inutile d'enfoncer un puits dans ce calcaire à une profondeur plus grande que cinquante pieds. Or, à Maisonneuve, on devait s'attendre à rencontrer le Trenton à une très faible profondeur. Par conséquent on s'exposait à se trouver, immédiatement après, dans un terrain parfaitement inconnu, avec tous les risques qu'amènent de semblables recherches.

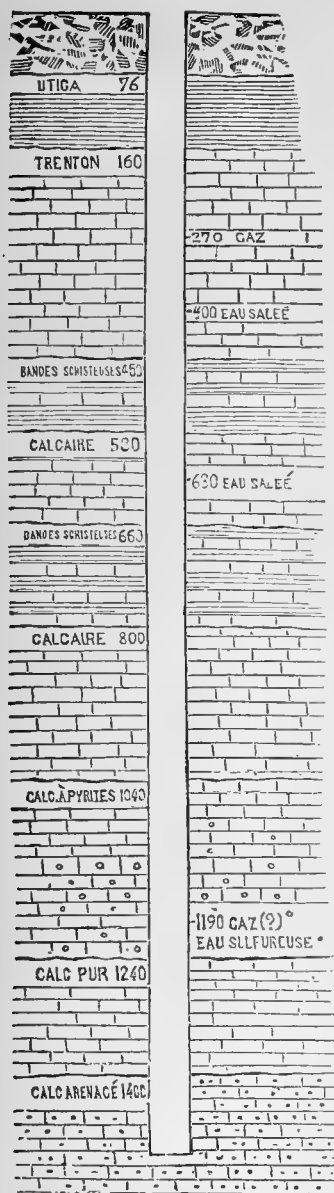


FIG. 2.

Voici le registre de ce puits, tel qu'il nous à été communiqué par le mineur :

Après une couche de drift épaisse de 76 pieds, on a rencontré le roc solide. Mais les veines d'eau y abondaient, et l'on s'est vu obligé d'enfoncer le tube de revêtement jusqu'à 248 pieds. A 270 pieds, la première veine gazeuse est apparue, suivie d'une autre à 400. Puis à 630 pieds une source abondante d'eau salée, et enfin à 1,120 s'est produit un dégagement abondant de gaz accompagné d'une grande quantité d'eau sulfureuse. La quantité de gaz a diminué bien vite pour devenir presque nulle; mais l'eau sulfureuse sort toujours par l'ouverture du puits. Les travaux ont été arrêtés à 1,500 pieds. Entre 760 et 765 pieds, les échantillons retirés du puits dégageaient une forte odeur de pétrole. Cette circonstance ne s'est pas reproduite à aucun autre niveau du puits.

D'après les échantillons que j'ai eus à ma disposition, et qui auraient été recueillis à environ tous les vingt pieds, voici la section de ce puits, résumée d'ailleurs dans la fig. 2 :

Le premier roc frappé a été le schist Utica, sur une épaisseur d'environ 80 pieds, puis le calcaire Trenton, tel qu'on le trouve dans les environs de la montagne de Montréal. A 405 pieds est apparu un calcaire mélangé de minces lits de schistes noirs. Ces derniers lits ont peu à peu augmenté en nombre et en puissance jusqu'à environ 530 pieds. Ces schistes sont fonceés, friables et doux au toucher. Le calcaire pur et brun a recommencé ensuite pour se continuer jusqu'à 660 pieds, alors que sont revenus des schistes analogues en apparence aux précédents, mais dégageant, de plus, une forte odeur de pétrole. De 690 à 705, calcaire pur; de 705 à 725, nouvelles bandes schisteuses moins bitumineuses que les précédentes; puis 20 pieds de calcaire. Ce dernier devient notablement plus fonceé avec interstratifications de schistes bitumineux se continuant jusqu'à 800 pieds, point où le calcaire pur fait de nouveau son apparition. De 1,000 à 1,240 pieds, le calcaire

renferme des cristaux de pyrite de fer, puis il devient pâle, cristallin, pour apparaître légèrement arenacé au fond du puits, à 1,500 pieds.

Ce forage a-t-il traversé toute l'épaisseur du groupe de Trenton? Il nous semble que non. L'homogénéité des couches supérieures et inférieures nous paraît trop grande pour croire qu'elles appartiennent à deux époques géologiques différentes. Toutefois, il est évident qu'à 1,500 pieds de profondeur, la tarière devait arriver à la limite inférieure de

cette formation. Il est regrettable au point de vue scientifique qu'on n'ait pas poussé encore quelques centaines de pieds plus loin. Il eût été du plus haut intérêt pour les géologues de connaître sur quelles bases repose notre Trenton. De plus, n'y aurait-il pas eu possibilité de trouver du gaz à des horizons aussi profonds ? Nous croyons que sa présence n'aurait pas été une surprise. D'autant moins que l'on voit des assises plus anciennes encore, comme le groupe de Québec, renfermer des matières bitumineuses en quantité considérable.

D'ailleurs, l'opinion tend à se répandre de plus en plus parmi les géologues qu'on devra trouver du gaz dans presque toutes les formations géologiques, du moment que les conditions physiques et chimiques nécessaires à sa production et à sa conservation dans des réservoirs souterrains appropriés auront été réalisées. Ainsi, à Saint-Grégoire, on a obtenu une veine gazeuse assez puissante à la base du drift. Dans le Missouri, le même drift produit une quantité utilisable du même combustible. De son côté, M. le docteur G. M. Dawson a étudié un dégagement gazeux considérable dans un puits foré à Cassil, territoire du Nord-Ouest, exclusivement dans le crétacé. Le même caractère se trouve dans le reste des formations, en descendant. Si bien que M. Ashburner va jusqu'à dire que la présence du gaz dans les formations archéennes n'est pas une impossibilité.

Sans pousser la généralisation aussi loin, nous regardons comme assez probable que le calcaire de Trenton ne forme pas la limite extrême des réservoirs gazeux, mais qu'on en découvrira encore d'autres dans les horizons plus inférieurs.

Les trois autres puits de la compagnie de gaz combustible ont été percés pendant l'année 1887, dans le village de Louiseville même, à environ 18 milles des Trois-Rivières, sur les bords du lac Saint-Pierre. Nous les appellerons les puits Nos 2, 3 et 4, d'après la date du forage.

Le puits No 2 frappa le schiste après avoir traversé 125 pieds de drift. Le revêtement fut poussé jusqu'à la profondeur de 146 pieds. A 210 pieds, une première veine de gaz se fit jour, mélangée avec de l'eau salée ; une seconde veine de gaz apparut à 260 pieds, accompagnée, elle aussi, d'eau minérale, et les travaux furent ensuite arrêtés. Le puits est maintenant rempli d'eau, sans dégagement de gaz. Le puits No 3 fut creusé à quelques arpents au nord-est du premier. Le schiste ne fut atteint qu'à 165 pieds. A 220 pieds, apparition d'une première veine de gaz et d'eau salée, suivie d'une seconde absolument analogue, à la profondeur de 295 pieds.

Nous possédons sur la section du puits No 4 des données plus complètes. Il a été poussé jusqu'à la profondeur de 645 pieds, et nous avons eu des échantillons de dix pieds en dix pieds, depuis 325 jusqu'au fond. L'examen que nous en avons fait nous a permis de constater une fois de plus qu'il faut toujours contrôler les affirmations des mineurs relativement à la nature des terrains qu'ils traversent. Suivant eux, le calcaire avait apparu à la profondeur de 500 pieds, et voilà que nous le trouvons parfaitement caractérisé à 350. De 350 à 490, nous trouvons constamment le même calcaire, à grains grossièrement cristallisés, et ressemblant beaucoup au calcaire de Deschambault. A 515 apparaît un calcaire décidément plus foncé et moins cristallin. A 545, de petits cristaux de pyrite de fer se voient dans le calcaire, et se continuent jusqu'à 575 pieds ; puis le calcaire redevient le même, un peu plus pâle toutefois, et se prolonge jusqu'à 645, où se trouve un lit très dur de grès, à grains jaunâtres et très fins. Le creusage s'est arrêté là.



Les détails de ces trois puits sont donnés dans les figures 3, 4 et 5, dessinées comme les précédentes à l'échelle verticale de 10 pieds par millimètre.

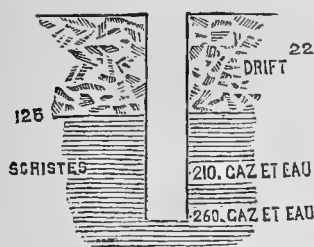


FIG. 3.

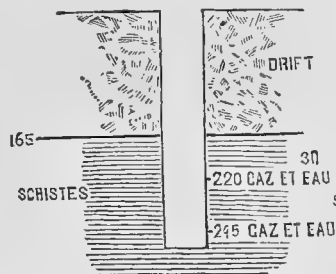


FIG. 4.

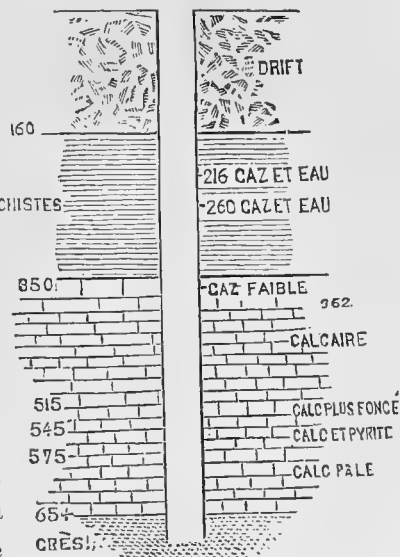


FIG. 5.

Nous croyons devoir attirer spécialement l'attention sur la présence du lit de grès très compact trouvé au fond du puits No 4, et que les ouvriers disent avoir creusé l'espace de huit pieds. C'est la première fois, croyons-nous, à part un puits à Dayton, Ohio, que la présence d'une semblable masse siliceuse est signalée dans la formation de Trenton. Il est bien vrai qu'au nord-ouest, à une douzaine de milles de Louiseville, les calcaires de Trenton reposent directement sur le grès de Potsdam, de même qu'au rapide des Grès, sur le Saint-Maurice. Il nous paraît difficile d'admettre que le grès du puits de Louiseville n'appartienne pas au groupe des grès de Potsdam; au risque, réduire l'épaisseur du Trenton à environ 300 pieds, ce qui constitue un minimum peut-être trop accentué, par comparaison avec toutes les sections connues de ce groupe. On ne peut croire à une erreur des mineurs. Nous avons vu le sable qu'on disait avoir été extrait de cette profondeur, et il était impossible de douter de sa nature.

Voici maintenant les veines gazeuses trouvées dans le puits. Une première veine à 216 pieds avec eau salée, une seconde à 260, une veine d'eau salée à 290, et à 342 un faible dégagement de gaz. A 644, une source abondante d'eau minérale excessivement riche en sel; 10 centimètres cubes renferment 208 grammes de substances solides, composées presque exclusivement de chlorure de sodium et de calcium en quantités à peu près égales, avec du chlorure de magnésium et un peu de sels de fer.

Après avoir fait pomper l'eau, nous avons mesuré la pression (*rock pressure*) que le gaz pouvait atteindre. Au bout d'une heure, le puits étant parfaitement clos, le manomètre indiquait 225 livres; c'était la limite de sa course. Nous croyons que cette pression aurait dépassé en définitive 250 livres.

Ce puits a été ensuite torpillé, mais sans augmenter son débit qui est resté très faible. La torpille avait été placée trop bas.

Nous croyons pouvoir le ranger dans la catégorie des puits à schiste, tels que décrits par M. E. Orton, et dans lesquels le gaz provient en totalité des couches supérieures au calcaire.

Le débit relativement faible de ces puits de schiste en général et leur constance laissent croire au même savant que la production du gaz se fait peut-être incessamment et que les puits débitent plutôt un produit qui se forme au jour le jour, qu'une accumu

lation préexistant depuis des siècles dans les couches atteintes par le forage. Le grand inconvénient de ces puits est l'existence presque constante de l'eau minérale qui sort en même temps que le gaz, et qui nuit à son dégagement quand elle ne l'arrête pas tout à fait. Il y a dans l'Ohio et l'Indiana de nombreux exemples de puits assez importants qui ont été complètement gâtés par l'envahissement de ces veines d'eau.

M. Orton, dont les magistrales études sur cette matière indiquent la vaste expérience et le remarquable esprit d'observation, affirme que ces puits de schistes sont éminemment applicables aux usages domestiques. Leur forage est peu dispendieux, et leur présence sur une ferme ajoute beaucoup à sa valeur. Il y aurait sans doute quelque chose à faire dans ce sens par les cultivateurs qui sont en mesure de se payer un tel luxe.

De ces trois puits, le seul utilisé est le No 3, lequel, grâce à un système de pompe qui en enlève de temps en temps l'eau salée, fournit assez de gaz pour chauffer la chaudière de l'aqueduc de Louiseville.

En comparant ces trois forages, on remarque que les deux veines de gaz rencontrées dans chacun d'eux se trouvent au même niveau dans les puits Nos 2 et 4, et notablement plus basses dans le puits No 3, ce qui indiquerait une disposition oblique des couches inférieures conduisant à une anticlinale dont la direction serait du sud-sud-ouest au nord-nord-est, et dont le sommet serait placé au nord-ouest du village de Louiseville. Le dégagement naturel qui se fait sur la ferme Saussier, près de la ligne du Pacifique, se trouve peut-être sur la faite de cette anticlinale.

Les veines gazeuses avaient apparu à un niveau plus bas dans le puits de Saint-Grégoire, mais il est impossible d'établir des relations plus particulières entre elles et celles de Louiseville. Il est certain toutefois que la surface du Trenton est beaucoup plus basse à Saint-Grégoire qu'à Louiseville.

Il nous semble en outre certain que le forage à Saint-Grégoire atteint à peine les horizons qui ont été traversés à Louiseville. M. le docteur Selwyn croit, d'après les notions données par sir William Logan dans la *Géologie du Canada*, qu'il aurait fallu traverser encore une épaisseur de 1,700 pieds pour arriver à la surface du Trenton. Ceci indique une différence d'inclinaison très marquée dans les couches profondes, suivant qu'on les examine au nord-ouest ou au sud-est du fleuve. Au nord du fleuve, sur les rivages, on les trouve à 350 pieds de la surface. Au sud, à une distance de quelques milles à peine, on ne les rencontrerait plus qu'à une profondeur de 3,000 pieds ou plus. Sans doute elles se relèvent en arrivant à l'anticlinale de Deschambault, mais cette inclinaison brusque dans l'espace de quelques milles est tout à fait remarquable, alors surtout qu'on les voit rester presque horizontales entre le fleuve et leur affleurement au nord-ouest.

Si nous pouvions raisonner ici par analogie, nous croirions qu'il y a dans la surface du Trenton, au nord-ouest du Saint-Laurent, une de ces suspensions d'inclinaison que M. Orton signale dans son rapport sous le nom de terrasses, en les donnant en même temps comme des circonstances favorables à l'accumulation du gaz. Dans ce cas, on pourrait encore faire quelques recherches au nord du fleuve, tout en fondant plus d'espérances sur les sondages faits au sud.

D'ailleurs, ne l'oublions jamais, les réservoirs gazeux sont susceptibles de grandes variations dans leur étendue et leur disposition, et, même sur une anticlinale donnée, ils se montrent souvent irrégulièrement distribués. Par conséquent, même dans le cas où

les recherches se feraient exclusivement au nord, il faudrait toujours tâtonner et, par suite, procéder avec beaucoup de prudence.

La faible épaisseur des lits schisteux qui, au nord du fleuve sont superposés au calcaire de Trenton permet d'expliquer comment il se fait que le gaz s'échappe si facilement de lui-même en un très grand nombre d'endroits, dans toutes les sources minérales, par exemple, dont les eaux, d'après M. le docteur T. S. Hunt, proviennent le plus souvent des schistes Utica et rivière Hudson. On se rend encore compte de ce curieux fait que les réservoirs gazeux découverts au nord du Saint-Laurent sont moins riches que ceux du sud. La faible épaisseur et la perméabilité des couches supérieures a permis au gaz de s'échapper en partie, un peu comme l'exsudation du pétrole, qui s'est produite sur les bords de l'Athabaska, au témoignage de M. le docteur R. Bell.

En effet, l'existence d'une couche imperméable continue, recouvrant les réservoirs de gaz, est une condition *sine qua non* de l'existence de ces derniers. Et, en suivant cet ordre d'idées, ce n'est pas là où le gaz se dégage spontanément en plus grandes quantités qu'il faudrait le chercher dans les profondeurs. Au contraire, l'exploitateur devrait surtout tourner son attention vers la *disposition physique des couches* qui servent de réservoirs à ce précieux combustible. Des études faites ainsi dans de bonnes conditions lui permettraient de le découvrir là où aucun indice extérieur ne décèle sa présence. Et ce serait après tout les endroits les plus favorables à une exploitation rémunérative.

Voilà à peu près tous les travaux qui ont été faits jusqu'ici par la compagnie des gaz combustibles de Québec.

Ils sont peut-être peu encourageants, surtout si l'on remarque que le calcaire de Trenton, sur lequel se fondent en général les plus belles espérances, a été atteint en deux circonstances sans résultats appréciables.

Toutefois, il ne faut pas perdre de vue qu'on avait à explorer un terrain nouveau, mal connu au point de vue spécial des recherches de ce genre. Espérons qu'un jour viendra où un heureux coup de trépan nous donnera le gaz naturel, cette richesse minérale si ardemment cherchée.

Dans le *Summary Report* pour l'année 1887, M. le docteur Selwyn recommande de continuer ces travaux au sud du Saint-Laurent, le long de l'anticlinale dite de Deschambault. Ce conseil est tout à fait rationnel, sans exclure toutefois, comme nous l'avons insinué plus haut, la possibilité de trouver des réservoirs de gaz assez puissants même ailleurs que le long de cette anticlinale. Qui sait si les formations n'ont pas, en certains endroits, une disposition qui nous échappe, grâce à l'épaisse couverture de drift qui les cache à la vue, et qui leur permet d'emmagasiner un volume notable de gaz combustible. Pour répéter une pensée de M. Orton, dans ces recherches souterraines, c'est le plus souvent le trépan qui a le dernier mot.

Dans une note publiée par la *Science*, l'année dernière, M. Orton énonce un fait d'une haute importance, fait qu'il me réaffirmait plus tard dans une lettre ; c'est que le calcaire de Trenton n'est pas en lui-même, ni de lui-même, un réservoir de pétrole ou de gaz. Pour qu'il puisse jouer ce rôle, il faut que, pour une raison ou pour une autre, il ait subi un changement chimique et soit devenu dolomitique. Cette remarque, qui s'applique à tous les puits de l'Ohio, mérite à tous égards de fixer l'attention des mineurs canadiens. Il sera assurément intéressant de constater si cette loi empirique se vérifie également pour

le Trenton du Canada. Nous ne voyons vraiment pas de raison pour qu'il en soit autrement.

Cette dolomitisation élève jusqu'à 80 pour cent la proportion de carbonate de magnésie; la silice disparaît à peu près; le calcaire de Trenton ordinaire en renferme environ 10 pour cent. Quant à l'origine de ces lits de dolomite, M. Orton, dans le sixième volume des rapports de la commission géologique de l'Ohio, croit pouvoir l'attribuer à une altération du calcaire pur déposé originellement. C'est ce que semble indiquer la présence de fragments assez volumineux de calcaire ordinaire, riches en fossiles, que l'on trouve complètement enveloppés par la dolomie. Ce changement a eu pour effet de détruire à peu près entièrement les fossiles, de donner aux couches une texture cristalline très accentuée, et par conséquent de les rendre beaucoup plus poreuses que ne sont les couches de Trenton ordinaire.

L'altération n'atteint pas une grande profondeur dans les lits calcaires. La limite inférieure est à environ 30 pieds de la surface. A 50 pieds, on ne trouve plus que des bandes étroites et rares de dolomie, souvent même, il n'y a que les couches les plus superficielles qui aient été affectées.

Malheureusement pour nous, les couches de Trenton traversées par les forages dont nous avons parlé précédemment ne présentent pas de traces évidentes de dolomitisation. Au contraire, leur caractère général de calcaire pur est parfaitement conservé.

Sans parler du puits de Maisonneuve, où l'on ne pouvait pas d'ailleurs s'attendre à trouver de gaz dans les lits supérieurs, tant à cause de leur faible distance de la surface que de leur voisinage des affleurements calcaires, l'analyse du calcaire de Louiseville est venue prouver évidemment cette absence complète d'altération dans les lits superficiels du Trenton.

L'analyse qui en a été faite par M. l'abbé E. Pagé, professeur de chimie à l'université Laval, a donné le résultat suivant :

Carbonate de chaux	= 78.5
Matières ferrugineuses	= 4
Matières insolubles	= 17
	—
	99.5

Pas de traces de magnésie, malgré la multiplicité des essais. D'ailleurs le pourcentage élevé de la silice rendrait lui-même douteuse la présence de la magnésie en quantité notable. Le puits No 4 de Louiseville qui a fourni cet échantillon est le seul où le Trenton ait été atteint, à part celui de Maisonneuve.

M. l'abbé Pagé a bien voulu examiner qualitativement différents échantillons du calcaire extrait de ce dernier. Voici le résultat de ces recherches. Echantillon extrait de la profondeur de 800 pieds : calcaire mélangé d'un peu de substances siliceuses, pas de magnésie, traces de fer. Calcaire de 1,040 pieds : comme le précédent, avec un peu plus de fer. Calcaire de 1,240 pieds : composition encore analogue, avec un notable pourcentage de magnésie. Calcaire de 1,400 pieds : renferme une proportion relativement considérable de fer avec très peu de magnésie. Le fer, comme nous l'avons dit plus haut, est presque toujours à l'état de pyrites, en cristaux souvent visibles à l'œil nu.

Comme conclusion générale, nous croyons pouvoir dire que les recherches faites jus-

qu'ici dans la province de Québec, n'autorisent pas encore à regarder le calcaire de Trenton comme constituant un réservoir de gaz ou de pétrole. D'un autre côté, ces travaux sont encore infiniment trop restreints pour qu'il soit permis de généraliser ces déductions d'une manière absolue. En revanche, les schistes Utica et rivière Hudson renferment le gaz naturel en quantité utilisable, du moins sur une échelle relativement restreinte. Il faut même espérer qu'un jour viendra où un mineur chanceux atteindra un réservoir de gaz comparable à ceux des autres pays.

Il résulte de là que les chercheurs de gaz ne sauraient être trop prudents dans la direction de leurs travaux. Et, malgré tout, ils seront encore obligés de courir certains risques pécuniaires. D'autant plus que notre sous-sol est encore complètement inconnu ou à peu près, relativement aux détails de sa structure physique.

Cependant, qu'ils ne se découragent pas si un succès de premier ordre ne vient pas immédiatement couronner leurs efforts. Il faut souvent des recherches nombreuses et continues pour trouver cette richesse minérale qui a pris chez nos voisins de si prodigieux développements depuis quatre ou cinq ans. Le gaz naturel a une valeur telle, son existence donne une si grande impulsion au progrès industriel d'un pays, qu'on aurait tort d'hésiter à faire quelques sacrifices pour arriver à le découvrir.



III.—*On Nematophyton and Allied Forms from the Devonian (Erian) of Gaspé and Bay des Chaleurs.* By D. P. PENHALLOW, B. SC. (*With Introductory Notes, by SIR WILLIAM DAWSON, F.R.S.*)

(Presented May 25, 1888.)

I.—INTRODUCTORY GEOLOGICAL NOTE. (*Sir W. Dawson.*)

1.—*Historical Sketch.*

My first introduction to the fossil plants since known as *Prototaxites* and *Nematophyton*, was in 1855. When in that year I came to Montreal, the late Sir W. E. Logan showed me, in one of the cases in the Museum of the Geological Survey, several large masses of black, silicified wood, which he had collected some years before in the Erian Sandstones of Gaspé, but which had not been studied microscopically. I was much interested in these plants, and in others since described by me as *Psilophyton*, more especially as they were the oldest fossil plants, other than Algæ, which I had seen; being found, according to Logan, in the Lower Sandstones corresponding in age to the Lower Devonian of England. By Sir William's permission, I had slices of the best preserved specimens made by Weston, and found that the structures were in a very perfect state.

I had noticed that the trunk collected by Logan, which must have been a foot in diameter, had resisted the compression which had flattened the other plants in the same beds; that the stems split into concentric layers when broken, like exogenous wood, and that they showed regularly arranged linear papillæ on the surface corresponding to the leaf-bundles of many fossil plants; that they presented transverse swellings or nodes, and cavities or knots, indicating the breaking off of small branches; that they possessed a coaly bark of remarkable thinness and density. All these appearances led me to infer, from past experience of fossil plants, that I had to deal with a very resisting and durable kind of wood. I was, therefore, not a little surprised when I found the structure to consist of loose, cylindrical tubes, running lengthwise in a very tortuous manner, and traversed by radiating horizontal spaces which I could only compare with the narrow and imperfect medullary rays seen in some *Sigillariæ*, and in the less perfectly organized types of Cycadaceous and coniferous trees. These spaces, however, showed no structure except loose tubes, which seemed to have fallen into them, but have been ascertained by Prof. Penhallow to have a structural significance. The rings of growth I found to consist of alternate bands of larger and smaller tubes, but the difference of these seemed insufficient to account for the very decided concentric cleavage and weathering of the stems, which was more marked than it usually is in Palæozoic Conifers.

The mode of occurrence and state of preservation of the specimens seemed to make it certain that they had belonged to land plants; but my previous experience did not supply me with any similar structures. After carefully examining a number of slices with such

microscopes as were then available, I concluded that these strange plants were altogether dissimilar from the *Lepidodendra*, *Sigillariæ* and similar trees of the Carboniferous, and the only plants which seemed to me at all similar were those "prototypal gymnosperms" which Unger had discovered in the Devonian of Thuringia, and had named *Aporoxylon*,<sup>1</sup> and which, with several other strange and mysterious plants of these old rocks, he had then recently described.

I was also struck with the resemblance of the tissue to that of certain Taxine woods when in a state of great disintegration. The wood of *Taxus* has remarkably long, cylindrical, and often somewhat tortuous fibres, and these are so loosely attached to each other that they appear almost round in cross-section, and they readily separate in decay. This property of the Yews gives them that remarkable toughness which commended itself to our ancestors for their bows, and the same peculiarity causes many of the fossil woods which have been referred to the genus *Taxites*, to present a very loose appearance, while when the outer walls of the cells are decayed, the inner lining seems quite cylindrical and crossed with minute fibres. This resemblance caused me to propose for the new plant the name *Prototaxites*, a name, perhaps, somewhat unfortunate, for though in my descriptions, I disclaimed any intention to suggest a close affinity to coniferous trees, botanists have persisted in inferring that I regarded this wood as coniferous and allied to *Taxus*.

A preliminary notice of the plant was communicated to the American Association at its meeting in Springfield, in 1856; but its more detailed description was prepared at a later date.

I have always endeavoured, in describing fossil plants, to visit the localities where they can be studied *in situ*, and to examine carefully their mode of occurrence and associations. For this reason, in 1858, I spent a week in Gaspé Bay, with the special object of collecting and studying this and other fossil plants. I had the advantage of Sir W. E. Logan's notes on the various coast sections, on which he had indicated the several places where plants had been found. I revisited Gaspé with the same objects and spent a longer time there in the summer of 1869, assisted by Dr. G. M. Dawson and Prof. Kennedy. The results of these visits were, among other things, the discovery of the fructification and habit of growth of *Psilophyton*, of *Lepidodendron Gaspianum*, *Arthrostigma*, and other ancient vegetable forms of the Devonian rocks, and the finding of several trunks of *Prototaxites* at various points on the north shore of Gaspé Bay. At Little Gaspé I also found stumps with branching roots apparently rooted *in situ* in the shales and argillaceous sandstones of the locality. Our researches were also rewarded by finding fish remains of the genera *Cephalaspis* and *Machæracanthus*, and several other animal fossils which have been described elsewhere.

I also ascertained that these remarkable plants had probably grown in the clays and sands in which *Psilophyton* and other plants had been rooted, and consequently, that, though probably marsh plants, they were not marine. They must have grown on low flats, probably often inundated, though whether this was with salt or fresh water is indicated merely by the negative fact that no properly marine organisms occur in the containing beds.

It was farther ascertained that the coaly outer bark is a constant accompaniment, and,

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<sup>1</sup> Palæontologie des Thüringer Waldes, by Richter and Unger.



therefore, represents a definite structure, that these trees attained a diameter exceeding two feet, had large and spreading roots and gave off lateral branches. Unfortunately, no structures referable to their foliage or fructification could be found. This was, however, not surprising, for it is the rule, in the case of fossil plants, that the beds holding trunks showing structure do not contain the more delicate organs.

It was farther found that *Psilophyton princeps*, *P. robustius*, *Arthrostigma gracile* and *Cordailes angustifolia* were constant associates of these plants. There were also in the sandstones, numerous fragments of fossil wood, showing structure similar to that of the trunks, and flattened branches of various sizes which might probably be referred to this species, though not showing structure or any definite external marking.

A little later, Dr. Robert Bell, when exploring on the rivers of Gaspé, found additional specimens, some of them with the structure very well preserved, and also specimens of a remarkable fossil resin, to which reference will be made in the sequel.

In subsequent visits to Gaspé and Bay des Chaleurs, other specimens were found, more especially a trunk no less than two feet five inches in diameter in the Bordeaux quarry opposite Campbellton, where it was associated with *Psilophyton* and quantities of fossil resin, and at Cape Bon Ami, where drift fragments were found in the marine Silurian shales associated with fragments of *Psilophyton*, and with the remarkable globular bodies named *Pachytheca*, to be noticed in the sequel. In 1870 I observed, in the Museum of the Geological Survey of England, fragments of woody matter in shales of the Ludlow formation holding *Pachytheca*, and on examining specimens kindly furnished by Prof. Etheridge, I found them similar to the Gaspé specimens. A still more interesting discovery is that of similar wood in the Denbighshire grits at the base of the Silurian, by Dr. Hicks.<sup>1</sup>

The wood-cuts (Figs. 1, 2, 3) show the mode of occurrence of some of the trunks, and in my Reports on the fossil plants of the Erian of Canada,<sup>2</sup> will be found many additional details as to mode of occurrence and state of preservation.

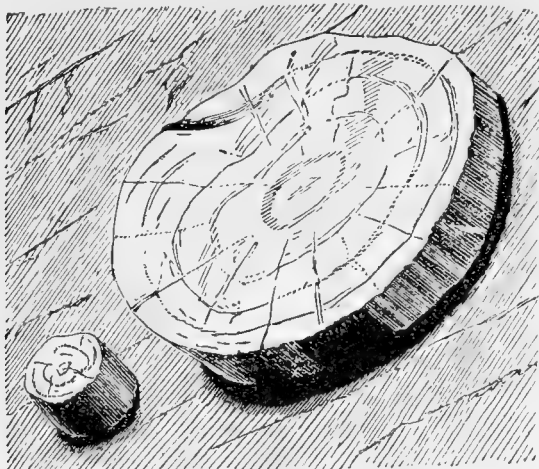


FIG. 1.—Trunk and branch of *Nematophyton* in Sandstone cliff, Gaspé.

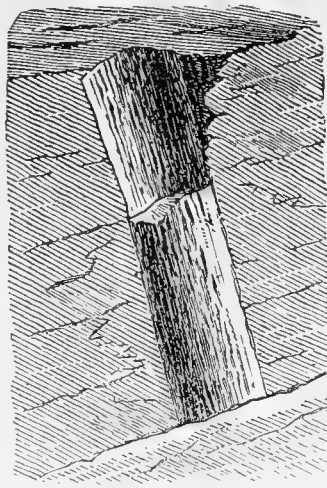


FIG. 2.—Erect trunk of *Nematophyton* one foot in diameter, Gaspé.

<sup>1</sup> Quarterly Journal Geol. Soc. of London, 1881.

<sup>2</sup> Geol. Survey of Canada, 1871 and 1882.

2.—*Geological Relations.*

North of Gaspé Bay, the Silurian limestones extend into the promontory of Cape Gaspé, with dips to the south-west. These beds, which attain a thickness of about 2,000 feet, hold numerous marine fossils, which in the upper part are those elsewhere characteristic of the Lower Helderberg series. Near Little Gaspé they are conformably overlaid by sandstones and shales, which in some places hold *Rensellaria ovoides* and other species found in the Oriskany of the west, and in which are also found the fucoids known as *Spirophyton*. These beds are the lowest in the great Erian or Devonian series of Gaspé Bay, which, according to Logan's measurements, is more than 7,000 feet in thickness. Arranged in a synclinal form, they occupy both sides of the bay.

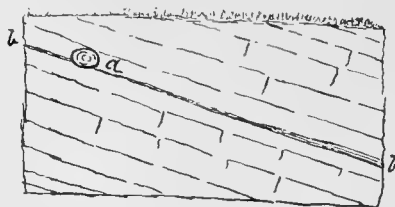


FIG. 3.—Section showing position of a prostrate trunk of *Nematophyton*, (a) on an underclay, (b) filled with *Psilophyton*—Gaspé.

A few fossil plants, mostly fucoids, occur in the Silurian limestones, but in one bed, not far above the base of the series, are fragments of rhizomata of *Psilophyton* in some of which the scalariform tissue of the axis is well preserved. In the overlying sandstones, fragments of plants are abundant, and in the lowest beds in Little Gaspé Cove, I observed two great stumps of *Nematophyton* with their roots spreading in the sandstone, while in the vicinity of this place there are underclays filled with rhizomata of *Psilophyton*, and extensive fields of these plants *in situ*. The following extracts from my notes of 1869 farther illustrate the structure of the Gaspé sandstones:—

"The Gaspé sandstones, as their name imports, are predominantly arenaceous, and often coarsely so, the sandstones being frequently composed of large grains and studded with quartz pebbles. Gray and buff are prevalent colours, but red beds also occur, more especially in the upper portion. There are also interstratified shaly beds, sometimes occurring in groups of considerable thickness, and associated with fine-grained and laminated argillaceous sandstone, the whole having in many places the lithological aspect of the coal measures. At one place, near the middle of the series, there is a bed of coal from one inch to three inches in thickness, associated with highly bituminous shales abounding in remains of plants, and also containing fragments of crustaceans and fishes (*Pterygotus*, *Ctenacanthus*? etc). The beds connected with this coal are grey sandstones and grey and dark shales, much resembling those of the ordinary coal formation. The coal is shining and laminated, and both its roof and floor consist of laminated bituminous shale with fragments of *Psilophyton*. It has no true under-clay, and has been, I believe, a peaty mass of rhizomes of *Psilophyton*. It occurs near Tar Point, on the south side of Gaspé Bay, a place so named from the occurrence of a thick dyke of trap holding petroleum in its cavities. The coal is of considerable horizontal extent, as in its line of

strike a similar bed has been discovered on the Douglas River, about four miles distant. It has not been recognised on the north side of the Bay, though we find there beds, probably on very nearly the same horizon, holding *Psilophyton in situ*.

"As an illustration of one of the groups of shaly beds, and of the occurrence of roots of *Psilophyton*, I may give the following section, seen near 'Watering Brook,' on the north shore of the Bay. The order is descending:—

	Ft. In.
1. Grey sandstones and reddish pebbly sandstone of great thickness .....	
2. Bright red shale.....	8 0
3. Grey shales with stems of <i>Psilophyton</i> , very abundant but badly preserved .....	0 5
4. Grey incoherent clay, slicken-sided, and with many Rhizomes and roots of <i>Psilophyton</i> ..	0 3
5. Hard grey clay or shale with fragments and roots of <i>Psilophyton</i> .....	4 0
6. Red shale. ....	8 0
7. Grey and reddish crumbling sandstone .....	

"Groups of beds, similar to the above, but frequently much more rich in fossils, occur in many parts of the section, and evidently include fossil soils of the nature of under-clays, on which little else appears to have grown than a dense herbage of *Psilophyton*, along with plants of the genus *Arthrostroma*.

"In addition to these shaly groups, there are numerous examples of beds of shale of small thickness, included in coarse sandstones, and these beds often occur in detached fragments, as if the remnants of more continuous layers partially removed by currents of water. It is deserving of notice that nearly all these patches of shale are interlaced with roots or stems of *Psilophyton*, which sometimes project beyond their limits into the sandstone, as if the vegetable fibres had preserved the clay from removal. In short, these lines of patches of shale seem to be remnants of soils on which *Psilophyton* has flourished abundantly, and which have been partially swept away by the currents which deposited the sand. Some of the smaller patches may even be fragments of tough swamp soils interwoven with roots, drifted by the agency of the waves or possibly by ice; such masses are often moved in this way on the borders of modern swamps on the sea coast.

"In the sandstones themselves there are great quantities of drifted plants, principally fragments of *Psilophyton*, which are sometimes matted together, as if they had drifted in peaty sods, in other cases scattered loosely over the surfaces, and often in very small fragments. The sandstones also contain large drifted trunks and stumps of *Prototaxites*.

"In the coarser sandstones there are numerous bony spines of large fishes (*Machæracanthus*), and in some of the finer beds, spines and bony plates of smaller fishes, apparently of the genera *Coccosteous*, *Ctenacanthus* and *Leptacanthus*. In one of these beds my assistant, Mr. Kennedy, was so fortunate as to find a nearly perfect specimen of *Cephalaspis*, the first found in America, and a new species.<sup>1</sup>

"Some of the finer beds also hold shells of *Lingula*, and lamellibranchiate shells of the genus *Modiomorpha* of Hall. It is a curious point of coincidence of the Gaspé sandstones with the old red sandstone of Scotland, that there are, in some of the dark shales containing these shells and also fragments of plants, clusters of rounded bodies of the nature of the *Parka decipiens* of Forfarshire, though of smaller size than the Scottish specimens. When best preserved, they appear as flattened globes with a depression in

<sup>1</sup> Described by Mr. E. Ray Lankester in the Geological Magazine (1870) as *Cephalaspis Dawsoni*.

the centre of each, and laid close together in one plane. They are most frequently attached to loose valves of bivalve shells. They must have been soft bodies covered with a tough smooth membrane, and were probably the ova of molluscs or crustaceans. Of the latter, fragments referable to *Dithyrocaris*, *Eurypterus*, *Pterygotus*, *Ceratiocaris* and *Beyrichia* occur in these beds.

"Prof. Hall has kindly compared the molluscos remains with those of the Devonian of New York. He does not profess to give a conclusive judgment on them, but states that their aspect is that of the Hamilton group.

"The only remaining point connected with local geology to which I shall allude is the admirable and exceptional facilities afforded by the Gaspé coast both for ascertaining the true geological relations of the beds, and for studying the Devonian plants, as distinctly exposed on large surfaces of rock. On the coast of the River St. Lawrence, at Cape Rozier and its vicinity, the Lower Silurian rocks of the Quebec group are well exposed, and are overlaid unconformably by the massive Upper Silurian limestones of Cape Gaspé, which rise into cliffs 600 feet in height, and can be seen filled with their characteristic fossils on both sides of the cape. Resting upon these, and dipping at high angles toward Gaspé Bay, are the Devonian sandstones, which are exposed in rugged cliffs slightly oblique to their line of strike, along a coast-line of ten miles in length, to the head of the bay. On the opposite side of the bay they reappear; and, thrown into slight undulations by three anticlinal curves, occupy a line of coast fifteen miles in length. The perfect manner in which the plant-bearing beds are exposed in these fine natural sections may serve to account for the completeness with which the forms and habits of growth of the more abundant species have been disclosed and will be described in the following pages."

The upper part of the Bay des Chaleurs presents another trough of Erian rocks somewhat similar to that of Gaspé Bay, but much richer in remains of fossil fishes. The lower beds, consisting of agglomerate, sandstone and hard shale, are well seen near Campbellton and on the opposite side of the Restigouche River in the Bordeaux quarry, which shows thick beds of sandstone perhaps a little higher in the series: Near Campbellton, the shales abound in *Psilophyton*, while *Arthrostigma* and *Leptophleum* also occur. At Bordeaux quarry there are numerous specimens of *Psilophyton* and *Rhodea*, and also surfaces covered with quantities of the resinous bark to be mentioned hereafter. The largest trunk of *Nematophyton* yet found in the Bay des Chaleurs, two feet five inches in diameter, occurs in this quarry (Fig. 4.), and also stumps with gnarled roots. That these beds, near and opposite to Campbellton, are Lower Erian, is proved not only by their stratification and fossil plants, but by the fossil fishes of the genera *Cephalaspis*, *Coccosteus*, etc., discovered in them and described by Mr. Whiteaves.

Farther to the east, in Scaumenac Bay, opposite to Dalhousie, the Upper Erian beds, consisting of grey and red sandstones and shales appear, and are overlain by the red conglomerates of the Lower Carboniferous. These beds hold fishes of the genus *Pterichthys*, and their characteristic plants are ferns of the genus *Archæopteris* which are not found in the lower series. *Nematophyton* is not known to occur in these upper beds.

The following table shows the general relations of the Gaspé and Bay des Chaleurs beds to those elsewhere :—

SUBDIVISIONS.	New York and Western Canada.	Gaspé.	Bay des Chaleurs.	Southern New Brunswick.
Upper Devonian or Erian.	Chemung Group.	Upper Sandstones, Long Cove, &c.	Scaumenac Beds.	Mispec Group. Shale, Sandstone and Conglome- rate.
Middle Devonian or Erian.	Hamilton Group.	Middle Sandstones. Bois Brulé, Cape, Oiseau, &c.	Not yet recog- nised.	Little R. Group (in- cluding Cordaite shales and Da- doxylon Sand- stone).
Lower Devonian or Erian.	Corniferous and Oriskany Groups.	Lower Sandstones. Gaspé Basin, Little Gaspé, &c.	Campbellton and Bordeaux Quarry.	Lower Conglome- rates, &c.

So far as yet known, the trunks of Nematophyton are confined to the lower members.

### 3.—Associated Organisms.

The question naturally occurs with reference to a plant so widely distributed in space and time, whether any other organs than the stem and roots have been preserved.

Perhaps the most constantly associated body is that to which Hooker has given the name *Pachytheca*, from the Ludlow bone beds, holding also fragments of Nematophyton, and stems supposed to be those of land plants.<sup>1</sup> As described by Dr. Hooker, they are spherical bodies, varying in size from one line to one-quarter of an inch, and must have been hard and resisting, as they have suffered no compression or distortion. This is explained by the fact that their walls are fully twice as thick as the cavity they enclose, and are composed of radiating cells closely placed together. Hooker names the species *P. Sphærica*. Subsequently, Mr. Charles Brongniart described specimens of similar structure from the Carboniferous under the name *Ætheotesta*. He regarded them as possibly gymnospermous seeds.<sup>2</sup> Similar fossils have been described by me from the Devonian of Scotland, where they were collected by Rev. T. Brown. Still later I found these bodies not uncommon in the Silurian beds holding fragments of Nematophyton at Cape Bon Ami, near Dalhousie, and at the Bordeaux quarry, while Hicks has found them in the Corwen beds holding Nematophyton. It is farther to be observed that the radiating tubes resemble those of Nematophyton, not merely in their form, but in their evidently exceptional density and durability. The minute rounded bodies observed by Etheridge in the cells of the Corwen specimens, I take to be accidental and concretionary.<sup>3</sup>

This frequent association and similarity of structure leave no doubt in my mind that these bodies were connected with Nematophyton, and probably its fruit, and that the density and durability of the envelope or testa of these fruits was, as usually holds in similar cases, intended to protect the nucleus of the seed, and possibly to adapt it to floatage to a distance on water. Unfortunately, only the thick wall of these reproductive

<sup>1</sup> Journal Geol. Society, vol. ix, p. 12.

<sup>2</sup> Ann. des Sciences Naturelles, vol. xx.

<sup>3</sup> Journal Geol. Society, Aug., 1881.

bodies has been preserved, and so far as I am aware, the interior structures have perished. I have elsewhere noticed the microscopic appearance of these bodies, both in the Corwen specimens and those from Cape Bon Ami.<sup>1</sup>

Of the other plants found with *Nematophyton*, there are none that can with any certainty be connected with it. In the following notes, Prof. Penhallow has described some other stems or branches showing structure, but these were probably specifically or generically distinct. *Psilophyton*, its most common associate, was a low-growing plant, with cord-like rhizomata and an entirely different structure, having an axis of scalariform vessels with cellular bark. The same remark applies to *Arthrostigma*. The fucoids known as *Spirophyton* were low-growing plants, of delicate, perishable texture. In the Gaspé sandstones and at Bordeaux quarry there are flattened, coaly, branching bodies, which may possibly have belonged to *Nematophyton*, and if I were disposed to conjecture as to possible foliage, I would refer to the long linear leaves without apparent nerves, which I have named *Cordailes angustifolia*, and which seem to have been attached in a spiral manner to slender stems or branches. No actual evidence, however, of the structures of *Nematophyton* in connection with these leaves has been observed.

Another singular associate of *Nematophyton* would seem to indicate that it was a resinous plant. In the sandstones of Gaspé basin there occur laminae of a resinous substance resembling amber, associated with Carbonaceous films, and with fragments of *Nematophyton*. Specimens collected by the officers of the Geological Survey have been analyzed by Dr. Sterry Hunt,<sup>2</sup> and are regarded by him as a fossil resin, and the manner in which it occurs in thin sheets, and these attached to plates of coaly matter, indicates that it has been a secretion in the bark of some tree. The same material occurs in the same manner in the Bordeaux quarry in the flaggy sandstones holding *Nematophyton*. In these sandstones, the resinous matter is in thin shining structureless flakes, often attached to flakes of coaly matter, and evidently represents exudations of resin in or over vegetable surfaces. Now, as no other arboreal plant than *Nematophyton* is known in these beds, and as fragments of its structure are associated with the resin, the inference would be that the resinous matter was produced by it. If it was a resinous plant, this would also serve to account for the remarkable preservation of the fibrous structure of the mass of the stem, otherwise so inexplicable in a plant apparently of so lax structure. It is true that the resinous matter has not yet been actually found in connection with stems of *Nematophyton*, unless it is represented by a slight varnish of asphaltic matter, sometimes seen in what seem to be fissures of the stem, or by certain yellow microscopic bodies which appear in some slices of the roots, so that this reference must be for the present conjectural.

It may be said that resinous Coniferous trees, as yet unknown, may have existed; but the genus *Dadoxylon*, the earliest of these trees, is not known to occur till the Middle Devonian,<sup>3</sup> though found at that horizon, in various parts of America and of Europe, and there is no evidence that trees of this genus produced resinous matter, though in the vast number of trunks occurring in the Devonian and Carboniferous, some indication of this might have been expected, had it been present. On the other hand, in some of the beds

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<sup>1</sup> Fossil Plants of Erian. Geol. Survey, Canada, 1882.

<sup>2</sup> Logan's Geology of Canada, p. 791.

<sup>3</sup> Geology of Canada, l. c.

holding Nematophyton, so great quantities of fossil resin occur, that it has been proposed to inquire as to the possibility of its economic use.

#### 4.—General Relations.

For the minute structure I may now refer to the careful examinations of Prof. Penhallow, who has had more complete material placed in his hands than has previously been submitted to any botanist, and whose extensive knowledge of vegetable anatomy well fits him for such an investigation. The only points on which I should be inclined to hesitate as to his deductions are those which relate to the bark and the probable existence of an internal pith or axis.

With respect to the first, though the coaly bark shows no distinct structure (the fibrous structure referred to by Prof. Penhallow belonging really to the outer part of the general tissue in contact with it), it is so constant in all the specimens I have studied and so clearly defined in limit and state of preservation, that I cannot doubt that it was as distinct as the similar coaly coating on other trees of the Erian and Carboniferous. It may also have lost much of its exterior material by abrasion. This is, I think, farther indicated by the strongly wrinkled and furrowed appearance which it presents in old stems.

With regard to internal axis or medulla, though this does not appear, yet the partial flattening and distortion of the stems shows that there was either an internal axis or an internal cavity. This is well seen in the indented outline of the great trunk in the Bordeaux quarry, as seen in Fig. 4. It is to be observed here that in Carboniferous trees of

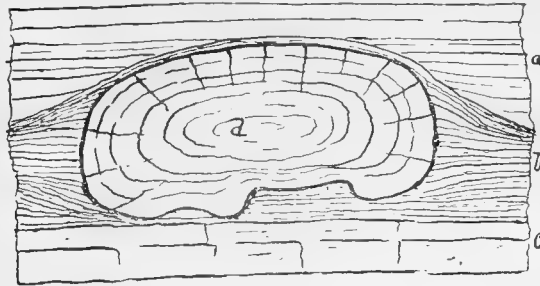


FIG. 4.—Prostrate and partially compressed trunk of Nematophyton 2½ feet in diameter—Bordeaux quarry, opposite Campbellton. (a) Flaggy Sandstone with resinous matter. (b.) Shale with Psilophyton. (c.) Sandstone. (d.) Silicified trunk with thin coaly bark.

the type of Sigillaria, it is not unusual to find a thick inner bark of long tortuous fibres, often constituting nearly the whole of the trunk, and which is much less perishable than the thin woody axis. I hold it, therefore, to be possible, that Nematophyton possessed either a cellular medulla or a woody axis or an internal cavity, which in all the specimens hitherto found has collapsed and disappeared.

Lastly, under this head, palæontology has made us familiar with many remarkable botanical anomalies, as the possession of true exogenous structure by acrogenous plants of the families of Lycopodaceæ, Equisetaceæ and Ferns, though this structure exists with the same types of scalariform and cellular tissue found in the modern acrogens. It



would only be a farther extension of the same principle to find a pseudo-exogenous stem of still greater antiquity, constructed wholly or principally of long, tortuous fibres similar to those in some lichens and algæ, from which, however, I regard the tissues of Nematophyton as essentially distinct. It is farther to be observed that since Nematophyton extends downward from the Lower Devonian, and antedates any known Conifer, it belongs to a time as much older than the coal formation, as this is older than the Cretaceous, and so to a far earlier period of the earth's history. Thus it may represent a leading type of forest vegetation in the Silurian and early Devonian, and which disappeared before the introduction of the Dadoxylons and other trees of the Middle Devonian and later formations. I have also been disposed to regard it as possibly a late survivor of a type of vegetation which may have existed even in the Cambrian and Laurentian, and may have been connected with the accumulation of the great quantities of carbonaceous matter known in the latter, and with that of the vegetable debris abundant in some parts of the former, and which, though it has not yet afforded distinct structure, presents indications of longitudinal fibres akin to these of Nematophyton, and appears in similar angular fragments to those representing that type in the Silurian.

## II.—NOTES UPON THE FOSSILS. (*Prof. Penhallow.*)

### 1.—*Nematophyton Loganii*, Dawson.

*Prototaxites*, Dn.

*Nematophycus*, Carr.; Jn'l Geolog. Soc. XV, 484; Aug., 1881, 482; May, 1882, 104; Geolog. Surv. of Can., 1863, 401; 1871, 16; 1882, II. 107; Can. Nat., (New Ser.), VII, 173; Ann. and Mag. of Nat. Hist. 5, IX, 59; M. Mic. Jn'l VIII, 160; X, 66, 208; XI. 83; Quart. Jn'l Mic. Sc. XIII. 313; Amer. Nat. V. 245, 185.

Early in the winter of 1886-'87, Sir Wm. Dawson placed several slides of *Prototaxites* in my hands, with the request that I should make a careful examination of them. The specimens consisted of several cross and longitudinal sections, all taken from the main stem of the plant, with the exception of one which was cut from what was at first thought to be a branch or root. This we shall deal with separately. Several of the sections—two in particular—were beautifully prepared, and admitted of very critical examination. From them were taken the photomicrographs, illustrating this paper. The others, thicker and more opaque, were used only for the determination of the more general structural features under a low power. The stem from which these sections were taken, and from which several others have more recently been cut, for the purpose both of verification and of more extended examination, is designated in the Museum collection as No. 5.

The literature of the subject, as cited above, is not very copious. It embraces a paper by Mr. Henry Hicks on the discovery of a plant in the Denbighshire Grits of Wales, which Mr. Carruthers identified as the *Prototaxites*<sup>1</sup> of Sir Wm. Dawson. With this exception, the literature consists chiefly of a discussion between the founder of the genus and species, Sir Wm. Dawson, and Mr. Carruthers, to whom specimens were

<sup>1</sup> *Nematophycus Hicksii* of Etheridge, Quart. Jn'l Geol. Soc., Aug. 1881, 494.



subsequently submitted for examination, relative to the proper structure and affinities of the plant. As it is the principal object of the present examination to throw such additional light as may be possible upon this controversy, it may be well briefly to pass in review the leading points of the discussion.

The original description of the plant is as follows<sup>1</sup> :—

“Woody and branching trunks, with concentric rings of growth and medullary rays ; cells of pleureenchyma not in regular lines, cylindrical, thick-walled, with a double series of spiral fibres ; discs or bordered pores few, circular and indistinct. The specimens are usually silicified, with the bark in a coaly state.”

In the text following this description, Sir Wm. Dawson expresses a doubt as to the actual presence of discs, when he says that “all present cylindrical wood fibres, marked with irregular spiral lines, and indications, perhaps illusory, of small, round pores placed at unequal intervals. The woody fibres are of great length, but not closely in contact with each other, giving to the wood a lax appearance, like that in very young coniferous stems. The fibres are not placed in regular radiating series, but are divided into wedges by radiating bands representing the medullary rays, and there are distinct lines of growth in which the fibres are of smaller diameter than elsewhere.”

The text further states that “with the exception of the lines of growth, I have failed to observe any change of structure in passing from the circumference to the centre. No pith has been observed, and the bark, when present, is thin and coaly. The roots have precisely the same structure with the stems, except that the fibres appear to be a little larger, and with the walls less thickened.

“In all the specimens there are evident indications of medullary rays, in radiating bands and lenticular spaces traversing the wood ; but the structure of the rays has perished, as one frequently observes in old and weathered trunks of modern trees. This would either indicate that the medullary rays were lax and perishable, or that all the specimens have been much decayed before fossilization.

“In one instance a large branch was observed to be given off, and on other trunks knots, representing the attachment of small lateral branches, like those of ordinary pines, were found. The most remarkable external marking consists in certain transverse swellings, which give to the trunk an irregularly articulated appearance. These swellings are connected with a gnarled appearance of the external layers of the wood, but the internal layers appear smooth, as if the structure supervened in an aged condition of the trunk.”

Although the absence of proper vascular structure is also recognised, the plant is held to have a dense woody structure, and regular exogenous mode of growth.

In his account of subsequent examinations of this fossil, Mr. Carruthers makes the following statement :—

“Under a low power, a transverse section exhibits a somewhat loosely aggregated mass of circular openings of nearly uniform size, except that there are recurring tracts of smaller and more closely aggregated openings. These tracts have a concentric arrangement, and are the rings of growth of Dr. Dawson. On submitting the specimens to a higher power, we find that the circular openings have well-defined walls of considerable thickness, and that they are nearly uniform in size, except where the tracts of small dia-

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<sup>1</sup> Geol. Surv. Can., Fossil Plants, 1871, 16.

meters occur. It is obvious that all these openings represent the same kind of tissue—that is, as far as they are concerned, the structure is perfectly uniform and simple. We further observe that, while the majority are cut transversely, some are cut more or less obliquely, showing that the direction of all of them is not truly at right angles to the section. Thus they are separated from each other by spaces often as great as the width of the opening, and sometimes much greater. It cannot belong to a Phænogamous plant.”<sup>1</sup>

After pointing out a want of resemblance to the vascular structures of Gymnosperms and Angiosperms, Mr. Carruthers combats the idea that medullary rays are present, and endeavors to show that the “double series of spiral fibres” in reality consists of an intercellular system of filaments, which traverse the structure in all directions. Finally, after directing attention to the peculiar structure and pseudo-exogenous growth of, as well as the great size sometimes attained by, certain Algæ, Mr. Carruthers definitely announces his views with reference to the probable affinity of Prototaxites, by assigning it to a new genus, *Nematophycus*.

It is unnecessary to review the discussion more in detail, and for a full account we must refer to the original articles cited; but with these salient points of the question before us, we are now prepared to see how far the present examination will serve to support the views announced. A *resumé* of what follows has already been given by Sir Wm. Dawson,<sup>2</sup> but we now desire to give the full results of our examinations up to the present time.

EXTERNAL CHARACTER.—Specimen No. 5, in the Peter Redpath Museum, exhibits the best preserved structure of all the specimens brought under my notice. It is black, and uniformly silicified throughout. The surface, which is marked by numerous rather fine, longitudinal ridges, shows the remains of a coaly layer, which appears to bear the relation of a cortical structure to the parts within. This layer is quite thin—hardly exceeding three mm.—and very friable, readily breaking up in all directions into irregular fragments. At about its central portion, the specimen shows a node-like swelling, which is traversed by a narrow furrow passing quite around the stem, thereby imparting an appearance closely resembling the node of a grass, and conveying the impression that it must represent the insertion of a broad-based, sheathing-leaf. Further examination, however, fails to show any remnants of vascular or other structure to support such a view.

Several very large specimens of more highly silicified trunks, wholly devoid of a coaly layer, show these swellings to occur at irregular intervals. It also appears that they rarely extend for more than a short distance in a transverse direction, and that they are not formed at a constant angle with the axis of growth. The appearance in such cases is well shown in a specimen figured by Sir Wm. Dawson in his original description of the fossil.<sup>3</sup>

None of the descriptions so far given recognise a pith, and in all of the specimens examined by us there is no evidence whatever to show that such a structure was ever present. The polished end of No. 5 does, nevertheless, exhibit certain lines (Plate I, fig. 2) which, from their radial direction and general disposition in the stem, bear a

<sup>1</sup> M. Mic. Jn'l, viii, 164.

<sup>2</sup> Geological History of Plants, 42.

<sup>3</sup> Geol. Surv. Can., Fossil Plants, 1871, plate ii, 19.

strong resemblance to true medullary rays. But a more critical examination discloses the fact that, in their want of continuity, and in certain other respects to be referred to more fully later, they possess peculiarities which are not consistent with true medullary rays. The transverse section, also, shows certain lines which give rise to false layers, undoubtedly referable to alteration under conditions of pressure. In addition to these, it is not difficult to also recognise certain fairly well defined layers, obviously due to differences of structure, and these layers, which are the "growth rings" of the original description, do bear a certain resemblance to the growth rings of exogens. Usually single (Plate I, fig. 3), they frequently appear double (Plate I, fig. 2). In No. 5 they are by no means concentric, but traverse the stem from side to side and find free terminations at the periphery, where they coincide with the longitudinal markings already referred to—the more dense portions corresponding to the longitudinal ridges, while the less dense parts coincide with the corresponding furrows. The peculiar disposition here noted is in all probability referable to changes under pressure, whereby both an alteration of form and a removal of the external layers were effected.

In the larger and more highly silicified specimens, where the form of the trunk is well preserved, the layers show a well-defined concentric arrangement, while the weathered extremity of one specimen shows a very distinct protrusion of the denser portions of the various layers, the less dense parts having weathered away precisely as occurs in true exogens.

INTERNAL STRUCTURE.—A microscopical examination of transverse sections at once renders it obvious that the appearance of layers referred to, is dependent upon variations in density of structure. The inner face of each layer is composed of relatively large and thick-walled cells, having a diameter ranging from  $13.6\ \mu$  to  $34.6\ \mu$ —the average size approximating to the latter dimension. These cells are also separated completely from one another, often by intervals which considerably exceed the dimensions of the cells themselves (Plate II, fig. 6). The outer face of each layer is composed of relatively small cells, which range from  $13.8\ \mu$  to  $27.6\ \mu$ , their average diameter approaching the former figure. From this it is obvious that there is sufficient variation in structure to cause the definition of layers, but when, in addition to this, we look for any abrupt transition from the more dense to the less dense structure, such as commonly occurs in conifers and other trees of exogenous growth, we find it wholly wanting. There is, in fact, no abrupt termination of the denser layer on its outer face, but the small cells merge somewhat gradually with the larger cells, in both an internal and external direction (Plate I, fig. 3 and Plate I, fig. 2), so that were it not for the curvature of the layer itself, it would be very difficult to determine to which of the less dense adjacent portions the more dense tissue properly belongs. All transverse sections show, in more or less striking degree, one feature of the structure which at once arrests attention. While the plane of section may cut the majority of cells at right angles, it is found to cut others obliquely, so as to show a considerable portion of their length, thus proving very clearly, as Mr. Carruthers originally pointed out,<sup>1</sup> that all the cells do not follow a parallel course, while it also

<sup>1</sup> M. Mic. Jn'l viii, 164; plate xxxi, c. We may remark here that the figures given by Mr. Carruthers, in his paper already cited, represent the various aspects of the structure in *Prototaxites* with great fidelity, as will be seen by comparison with the photomicrographs introduced into this paper.

indicates a distinct want of unity or of compactness in the structure as a whole. The want of parallelism thus shown is often seen in cross section in the strictly transverse direction taken by some of the cells. In longitudinal section this becomes much more obvious (Plate I, fig. 3), and in both sections is most pronounced in the immediate vicinity of the radial openings, into which the large, tubular cells penetrate at all angles<sup>1</sup> (Plate II, fig. 6).

A close examination of the transverse sections, also shows that the intercellular areas are more or less closely occupied by a system of much smaller, rather thin-walled filamentous cells, which are cut at various angles, sometimes exposing considerable length, at other times showing a transverse section. This structure becomes much more evident in longitudinal section, in which they are seen to cross the large cells in all directions. This feature, though not exhibited very clearly, is shown in one of the figures given by Mr. Carruthers<sup>2</sup>, and is also conspicuous in Plate II, fig. 5, just to the right of the centre, on the upper margin of the figure, where the small cells traverse a large cell diagonally downward to the left.

Longitudinal sections show that the principal part of the structure is composed of tubular cells of indeterminate length. In none of the various sections examined have we yet been able to detect either a transverse septum or a tapering extremity; but that the cells are not organically united is very obvious, not only from the variable intervals which separate them, but also from their very sinuous course, in consequence of which they wind in and out among one another in a great variety of ways (Plate I, figs. 1 and 3). It is also found that the myceloid filaments referred to, as seen in cross section, are very numerous, and that they traverse the structure in all directions, forming a most conspicuous feature, the proper nature of which it would be difficult to mistake. These filaments have a diameter of  $5.33\ \mu$ , and are the same as those found in the specimen to be described later. As these filaments cross the cells in all directions, they give to the wall of the latter a somewhat striated appearance, though a careful examination with good light cannot fail to discover their true nature. Nevertheless, we have observed that under certain conditions, they might be mistaken for striation of the cell wall. These filaments are the structures which gave rise to the original description of "a double series of spiral fibres," being figured as such by Sir Wm. Dawson.<sup>3</sup> They are more correctly shown in the figure by Mr. Carruthers,<sup>4</sup> which may be compared with photomicrograph in Plate II, fig. 5.

So far, all our examinations have failed to show any structure in the cell wall. It is also to be remarked that our specimens have so far presented no evidence whatever, to show that a proper intercellular substance or primary cell wall was present in the original structure, to unite the cells now visible. On the contrary, the entire aspect of the cells most forcibly suggests that they were either entirely free from the beginning, or that their union with one another could not have been established by anything more durable than a mucilaginous modification of the cellulose substance.

The ray-like openings in the tissue traverse the structure at right angles to the layers already noted. Sometimes they are continuous through two or more layers (Plate I, fig. 3), but more frequently their continuity is interrupted at short intervals, sometimes

<sup>1</sup> M. Mic. Jn'l viii, plate xxxi, b.

<sup>3</sup> Geol. Soc. Can., Fossil Plants, plate ii, 26.

<sup>2</sup> M. Mic. Jn'l viii; Pl. xxxi, c.

<sup>4</sup> M. Mic. Jn'l viii, 166, plate xxxii, b. c.

twice or thrice in the same layer. This appears in Plate I, fig. 2, where, to the left of the principal radial opening, a very short and detached area is seen to traverse *only* the smaller-celled tissue. A similar short opening is shown in longitudinal section in Plate I, fig. 4, the entire opening being brought within the limit of the figure. This shows that these open areas arise independently, and also that they pursue a very sinuous course with reference to the horizontal plane. Nor do they bear that constant relation to one another which might be looked for in true medullary rays. They frequently approach one another at a very considerable angle, and also show internal variations which it would be exceedingly difficult to account for in true rays upon any other ground than that of very advanced decay. Nor are these conditions of structure which can be satisfactorily explained on the ground of alteration through compression and other changes attendant upon the process of silicification.

In their internal structure, the "rays" show no evidence of cellular tissue. They are, on the other hand, irregularly elongated openings (Plate I, fig. 3), the central area of which is traversed in all directions by a felted mass of myceloid filaments of variable size. Very frequently, also, the large, tubular cells of the principal structure traverse these areas in all directions, and, in fact, it appears that it is in the immediate vicinity of these openings, into which they ultimately turn, that the principal cells take a direction obliquely or transversely to the axis of growth. In tangential section, these radial openings appear as channels of irregularly rounded form and size, without any regularity of disposition. The peculiarities of structure here indicated are clearly exhibited in Plate II, figs. 5 and 6, Plate I, fig. 3.

More recently, we have made a critical examination of the "node," as found in specimen No. 5, with the following results :—

The joint extends entirely across the stem in such a way that the removal of any part on either side exposes a flat face bearing a thin layer of a coaly, black substance. This leads us to infer one of two things, viz., that the joint represents a distinct transverse fracture, modified by longitudinal compression ; or that at this part of the stem there was originally a distinct septum, subsequently converted into a layer of coal, and its structure thus obliterated. Carefully prepared transverse and longitudinal sections passing through this particular part of the structure, were examined for any additional explanation they might afford. The former exhibited nothing which could be regarded as different from the structure in other parts of the stem. In the longitudinal section, the cells were, in some cases found to be more loosely disposed than elsewhere, and possibly exhibited a greater tendency to interlace, but in neither respect was the difference so marked as to enable us to regard it as peculiar to that particular part of the stem. So far as anything was indicated, it was that this region of the structure had sustained the full force of longitudinal compression, which thereby caused an external swelling of the trunk, with corresponding opening of the interior structure. This would harmonize with the appearance described by Sir Wm. Dawson. Moreover, along the entire face of the fracture, the cells were found to be all abruptly cut off, thus showing that instead of representing any peculiar structural feature, the joint is in reality a transverse fracture of the stem. The narrow opening thus formed eventually became filled with infiltrated material, and to a more limited extent with organic matter derived from the decay of the adjacent surfaces. In this we doubtless have a correct explanation of the amorphous coal

film already referred to. Similar thin coaly films also fill the narrow clefts which traverse the stem at somewhat frequent intervals in a longitudinal direction, and which obviously originated in alteration under pressure.

An examination of the outer coaly layer from No. 5 shows that it has exactly the same structure as the interior silicified portions, whence we may infer that, on the one hand there could have been no differentiation of a proper cortical structure, and that the tissue of the stem was of the same kind throughout; or else that with removal of the bark, were it originally present, the exposed surface layers of tissue were converted into coal.

Finally, we are prepared to consider one more structural peculiarity which has a most important bearing upon the true character of our plant, and its systematic position. We have already called attention to the fact that the large tubular cells take a horizontal or oblique direction, chiefly in the vicinity of the radial openings, into which they eventually run. The frequency with which this was found to occur, led us to the belief that there must be some special connection between the cells themselves and the open areas which they penetrated. For some time no adequate explanation could be reached, but after a careful search through all the sections then on hand, a single large cell entering the open area in a horizontal direction, was found to be distinctly branched. It had previously been noted that on entering these openings, the large cells usually became thinner-walled and more attenuated. The cell in question, however, was found to terminate in two distinct branches, the ultimate ramifications of which could not be determined on account of their having been cut away in making the section. In more recently prepared sections, we have found several such branching cells. In one case, five branches were found to arise from a cell at a section which was hardly longer than the diameter of the cell, and where there was a strong contraction in the latter. Other instances have also been noted. Not unfrequently the branching is indicated simply by a small round hole in the cell wall, where the branch projected towards the observer. In Plate II, fig. 5, on the extreme lower left-hand margin, there may be seen a cell with five distinct branches; while to the right of the centre there is another cell with at least seven well-defined branches, some of which project towards the observer, and, therefore, appear as round openings only.

This branching, so far as observed, occurs only in the radial openings, though we see no reason why it may not occur elsewhere. From the relations which we have thus established, we have no hesitation in stating that the system of smaller, intercellular myceloid filaments are nothing more nor less than the ultimate ramifications of the larger cells, and that the radial openings are the special areas within which the branching is accomplished.

In order to gain a clearer idea as to whether or not the structure described could be considered normal, we examined a number of sections of fossil woods, in which the operation of decay was too evident to admit of question. We also submitted to examination an old tamarack (*Larix Americana*) water-log, which, having been in use for eighty years, was assumed to represent, to some extent at least, conditions of decay which would be liable to be represented in fossil woods. In neither case could we obtain any evidence to show that the fossil now under consideration had suffered special decay; indeed, all the evidence pointed rather strongly in the opposite direction. It was at one time supposed by us that the intercellular filaments were fungoid mycelia incident to decay, but

we have now proved these to be part of the normal structure. All the cells show a well-rounded form and sharp outline, with none of the breaking down which would at once appear in a decayed tissue. We are, therefore, justified in the conclusion that the structure of *Prototaxites* is wholly normal.

From the foregoing facts, we are justified in the following conclusions :—

1st. The plant is not vascular, and the appearance of rings is independent of the causes which determine the layers of growth in exogens.

That the plants were of very considerable size, must be admitted, since specimens have been found having a diameter of eighteen inches,<sup>1</sup> and this implies a very considerable height. It is also true that rings dependent upon structural variations are also present, but the relations which the more and less dense portions bear to one another, show that they are not true growth rings, and, at most, represent only a pseudo-exogenous growth. The possibility of such size and mode of growth, even among Algæ, has already been pointed out by Mr. Carruthers.<sup>2</sup> Moreover, we have proved, not only the absence of a proper vascular structure, but the absence of a pith and medullary rays as well. From this latter fact, it is clear that there could have been no external structure differing very materially from the internal ; wherefore we conclude that—

2nd. The plant was possessed of no true bark. The tissue was of the same kind throughout, and whatever cortical layer may have been present, was in all probability only a superficial modification of that composing the general structure.

3rd. An intimate relation exists between the large tubular cells and the myceloid filaments, the latter being a system of small branches from the former ; the branching being determined chiefly in special open areas which simulate medullary rays. The relation here shown was suspected by Mr. Carruthers, although, from the sections examined by him, he was unable to establish the fact.<sup>3</sup> The distinct branching of the larger cells, and their peculiar relation to the open radial areas, can, however, hardly be interpreted in any other way.

4th. The specimens examined exhibit no evidence of special decay, and the structure throughout is of a normal character.

We are now brought to a consideration of our final and most important conclusion, viz., the affinities of the plant. The absence of structural markings, of vascular and fundamental tissue, as well also of a cortex, together with the branching and non-septate character of the cells—all show conclusively that there can be no affinity with vascular plants, much less with the Gymnosperms, in consequence of which the name *Prototaxites* loses its value.

Mr. Etheridge has pointed out the occurrence, in *N. Hicksii*, of an occasional fine striation.<sup>4</sup> This marking we have also noted in the case of at least two cells of this species, but, from the condition of preservation, which all the material so far examined exhibits, together with the fact that no similar marking has been seen in either of the other two species brought to our notice, leads us to question if it represents actual structure in the cell wall itself. *N. Hicksii* is found only in the form of small fragments, which strongly suggest the action of the waves in breaking up the half-dried plants as they

<sup>1</sup> Geol. Surv. Can., Fossil Plants, 1871, 17.

<sup>3</sup> M. Mic. Jn'l, viii, 169.

<sup>2</sup> M. Mic. Jn'l, viii, 170.

<sup>4</sup> Quart. Jn'l Geolog. Soc., Aug. 1881, 492; fig. 4.



were cast upon the beach. These fragments, instead of showing any well-connected structure, as in *N. Logani*, most generally break up into the individual cells, of which only the siliceous casts, to which fragments of the carbonized cell wall remain attached, appear.

The structure of *Nematophyton* is unique<sup>1</sup>; at least there is no modern plant with which it is strictly comparable. Nevertheless, the loose character of the entire structure; the interminable, interlacing cells; and, finally, their branching into a secondary series of smaller filaments, at once point with considerable force to its true relationship. That it is an alga, admits of no doubt; and so far as the structure alone will permit a final decision, its affinity with the Laminariaceæ, as first pointed out by Mr. Carruthers, who, therefore assigned it to the genus *Nematophycus*, appears to be highly probable.

Recently, Sir Wm. Dawson has modified his original views with regard to the nature of *Prototaxites*, and now assigns to it the name of *Nematophyton*,<sup>2</sup> a name which we have retained in the present paper.

Associated with *N. Logani*, Sir Wm. Dawson found a few small specimens of another fossil wood which he at first supposed might be a branch or root. An examination under the microscope, however, shows the structure to be, in some respects, quite distinct from *N. Logani*.

There are no concentric layers, nor are there any radial openings. The cellular elements are the same, but much more loosely disposed (Plate II, figs. 7, 8). The large tubular cells are non-septate, interminable, interlacing, and devoid of structural markings. In diameter they vary from 15  $\mu$  to 31  $\mu$ , and are, therefore, essentially the same as those in *N. Logani*, but, comparatively, they are very remote, and the large intercellular areas are filled in with a much more highly developed mass of fine, interlacing filaments, the diameter of which varies from 5.5  $\mu$  to 6.3  $\mu$ . While, therefore, the two agree in their main characteristics, there is a sufficiently marked difference to justify us in assigning the last to a distinct species, for which we would suggest the name *Nematophyton laxum*.

It only remains for us to summarise our results by including a description of the species so far as recognised.

#### Genus.—NEMATOPHYTON, *Dn.*

*Prototaxites*, *Dn.*

*Nematophycus*, *Carr.*

Plants of arborescent form from a branching, root-like base. Stem branching, often exceeding 1° in diameter. Structure composed of unjointed, interlacing, structureless and thick-walled cells, which branch into an intercellular system of small and closely-woven filaments.

- 1.—*N. LOGANI*, *Dn.*—Stem distinguished by its concentric layers, which simulate an exogenous structure; irregular and disjointed radial openings of variable length, and a thin cortical layer appearing in the form of coal.

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<sup>1</sup>The possibility of a connection between *Pachytheca* and *Nematophyton*, as pointed out by Sir Wm. Dawson, Mr. Carruthers and Mr. Etheridge, is of interest. These peculiar fruit-like bodies, together with certain laminated fossils found associated with *Nematophyton*, are now being examined, with a view to determining their possible relationship.

<sup>2</sup>Geol. Hist. of Plants, 21, &c.



Cells of the medulla,  $13-35\ \mu$  in diameter, interwoven, loosely aggregated and turning into the radial spaces. Secondary structure composed of branching filaments  $5-6\ \mu$  in diameter, which branch from the cells of the medulla and form a closely-woven intercellular plexus.

Lower Erian of Gaspé; Silurian (Upper Ludlow) of England; and Cape Bon Ami, New Brunswick (*Dawson*).

- 2.—*N. LAXUM*, *Pen.*—Concentric layers and radial openings, none. Cells of the medulla  $15-31\ \mu$  in diameter, remote, and branching into secondary filaments  $5.0-6.0\ \mu$  in diameter, which form a compact network, constituting at least half the structure, which is thus rendered very loose and spongy.

Lower Erian of Gaspé (*Dawson*).

- 3.—*N. HICKSII*, *Eth.*—This species occurs only in small fragments.

Cells of the medulla,  $12-22\ \mu$  in diameter,<sup>1</sup> and somewhat compact. Secondary filaments,  $1.0-1.5\ \mu$  in diameter, forming a rather less prominent plexus than in *N. Logani*; otherwise the same. Associated with this species there are frequently found clusters of spores measuring  $1.58\ \mu$  in diameter.

Denbighshire Grit (Silurian) of Wales (*Hicks*).

## 2.—*Laminated Fossils, with Nematophyton Logani.*

In December, 1887, Sir William Dawson submitted to me, for examination, a somewhat peculiar fossil which he had found during the previous summer at Campbellton, New Brunswick. It was imbedded in a somewhat coarse, grey sandstone, and associated with numerous small fragments of vegetable matter. Externally, it presented the appearance of a piece of laminated brown coal, which it really was. Its dimensions were 2.95 cm. long by 1.35 cm. wide, and its thickness appears to be about the same as the width.

The laminæ, when separated, showed evident foldings. They were also found to lie at all angles of obliquity with one another, while they also proved to have been pressed into one another to such an extent that complete casts were frequent; showing that they must have been in a soft condition and subjected to considerable pressure while in that state. The entire appearance continually suggested a mass of irregularly compacted, half-rotten leaves.

Under a pocket lens, there appeared no external evidence of veins, but the surface exhibited minute foldings, and also everywhere presented the appearance of a fine cellular structure. Several of the laminæ were carefully separated from the mass and submitted to special treatment. Boiling with caustic potash for an hour or more produced no sensible change in the character or in the clearness of the structure. Nitric acid rendered the structure slightly clearer. On platinum foil the substance readily burned with a copious flame, leaving behind a coherent film of grey ash. When mounted in balsam and examined under the microscope, this failed to reveal any special structure, showing that the silicification had not extended far enough to preserve the details of structure.

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<sup>1</sup> These measurements apply only to siliceous casts, and are, therefore, not strictly comparable with the preceding.

Numerous large cavities were, nevertheless, to be observed, indicating that the tissue of the plant was not continuous, but traversed in all directions by numerous intercellular spaces.

The laminæ are 0.25 mm. in thickness, and sometimes they show a tendency to split into two layers, as may readily be determined by a pocket lens. This would appear to indicate the presence, originally, of two outer and firmer membranes, enclosing a central layer of a less compact and resisting nature. Careful dissection showed that each one of the original laminæ can be wholly separated into two layers, each of which is similar to the other in its corresponding parts.

An examination of the internal structure proved it to have been badly preserved; nevertheless, areas were obtained where the tissue was sufficiently well preserved to enable us to reach fairly definite conclusions as to the nature of the remains.

The outer portions of the laminæ show a distinctly reticulated structure, approximating to an epidermal tissue, but no organs which could be referred to as stomata, were to be observed. In two instances out of several laminæ examined, a few openings in the structure were noted. These were narrowly elliptical, usually grouped within a narrow radius—in one case, five were found in two well-defined rows. Their average size, as determined from a measurement of six, was found to be  $29.48 \mu \times 86.36 \mu$ . Later measurements of other openings have given a greater size— $52.6 \mu \times 105.2 \mu$ . When the laminæ are complete, the openings are found to penetrate the structure for only a portion of its thickness, but when the former are split, the openings are then found to pass through, or nearly through, the separated parts. From this it would appear that they belong to the surface or cortical tissues, chiefly or wholly.

The interior structure of the laminæ consists of a mass of somewhat fine and numerous branching myceloid filaments, having a diameter of  $1.59 \mu$ — $2.12 \mu$  with occasional filaments of a coarser nature, having a diameter of  $4.7 \mu$ . There are also certain indications that much larger and rather thick-walled filaments may have been present, but of this we cannot be certain, as the structure is not sufficiently well defined. This entire system of filaments appears to find its outward termination in a reticulated structure, constituting the superficial tissue already described. Although this structure is, in most cases, destroyed, and, where preserved, difficult of determination, a very large number of examinations, under different conditions of illumination, amplification and treatment of the specimen, lead us to consider this as the true nature of the interior structure. Moreover, instead of forming a compact structure, the interlacing filaments enclose a large number of spaces or cavities, which are well defined and not to be mistaken. This, therefore, coincides with the appearance presented by the ash skeleton.

Both internally and externally, there is no trace of any vascular structure, and we are at least justified in the conclusion that the organism was purely cellular.

The structure thus described seems to indicate very strongly that our fossil must have been an Alga, and from a careful examination of the larger seaweeds found on the New England coast, we are led to consider it as allied to the Laminariæ, of which the genus *Saccorhiza* presents a structure with which it is fairly comparable, both with reference to its tissues and the openings or cryptostomata, which penetrate both surfaces of the frond. With reference to these latter structures, the only essential difference is one of size, the cryptostomata of *Saccorhiza* measuring  $252.4 \times 273.5 \mu$ .

Our examination indicates that the fossil consists of a mass of leaf-like organs, which, under the influence of partial decay, or through contained mucilage, became closely matted together. Subsequently, a portion was broken away from the mass, and after drifting an unknown distance, lodged and became fixed in the sand as found. This is the only view which appears to satisfactorily account for the peculiar form and character of the specimen.

That the laminæ are not the leaves of a vascular plant, is obvious from their structure, according to which we can only refer them to some Alga, of which they appear to have constituted the thallus. That this latter must have been narrow, or else composed of narrow divisions like the thallus of a *Fucus*, is suggested by the fact that all the laminæ showing entire margins do not exceed 1.6 cm. in width, while most of them are scarcely more than 0.5 cm. wide.

That the openings in the laminæ are cryptostomata seems to admit of little doubt, and this fact goes far to establish the true character of the fossil as algid.

That these structures have an algoid character, and that they occur in the same beds with *Nematophyton*, suggests their possible connection with that plant as its fronds. This, however, must obviously remain a mere suggestion, since no further connection between the two can be traced at present.

#### DESCRIPTION OF FIGURES.

##### PLATE I.

##### *Nematophyton Logani*, Dn.

- FIG. 1.—Longitudinal section, showing the peculiar interlacing of the cells.  $\times 27.5$ .  
 FIG. 2.—Transverse section, showing a double "growth ring"; also a radial opening passing through the centre of the figure, with two smaller and isolated openings to the left.  $\times 27.5$ .  
 FIG. 3.—Transverse section, showing a single "growth ring" crossing the figure transversely; and a radial opening.  $\times 56$ .  
 FIG. 4.—Longitudinal section of the same, showing the general character of the structure; also, in radial section, a short radial opening, as represented on the left of Plate I, fig. 2, into which the cells of the medulla are seen to penetrate.  $\times 56$ .

##### PLATE II.

##### *Nematophyton Logani*, Dn.

- FIG. 5.—Longitudinal radial section taken from the left central portion of the radial opening in Plate II, fig. 2, showing branching cells on the right and on the extreme left; also, two cells of the intercellular filaments crossing a large cell in the upper right-hand corner of the field. The clouded appearance of the large cells represents the disintegrated cellulose substance; the clear areas are portions of the vermicular cells cut away in making the section.  $\times 154$ .  
 FIG. 6.—Transverse section of the same, showing the loose character of the structure and the thick-walled cells of medulla turning into a radial opening.  $\times 154$ .

##### *Nematophyton laxum*, Pen.

- FIG. 7.—Longitudinal section showing the very loose and spongy character of the structure. The dark longitudinal bands are the large tubular cells of the medulla; the finer, transverse lines are the intercellular filaments. The specimen much less perfectly preserved than in the preceding.  $\times 154$ .  
 FIG. 8.—Transverse section of the same, showing the remote position of the cells of the medulla, the intercellular structure forming a somewhat dense mass.  $\times 154$ .



IV.—*On some Remarkable Organisms of the Silurian and Devonian rocks in Southern New Brunswick.* By G. F. MATTHEW, M.A.

(Read May 31, 1888.)

In the course of the last two years several peculiar organisms have been found in the neighborhood of St. John by the author and by a member of the Natural History Society.

ERRATA.

Page 56, line 3, for *Phinocaris*, read *Rhinocaris*.

" " " 5, after CERATIOCARIS insert (?).

" " " 29, for Smith read Schmidt.

" 58, " 21, for externs- read externo-.

" 62, " 18, after *Ceratiocaris* insert (?).

In the plate (No. IV) the largest figure (that in the centre) was laid down separately upon the stone upside down, hence the letters at the margins should be transposed to the opposite sides.

drew attention to the occurrence of peculiar fish plates in the Silurian,<sup>1</sup> rocks of the Nerepis Hills in Southern New Brunswick, referring them to the genus *Pteraspis*. Subsequently, on further examination and comparison, it was seen that these plates could not be those of a species of *Pteraspis*, though they belong to the family of which this genus forms a part. Nor could they be referred to any known genus of Pteraspidian fishes, owing to the fact that they formed the covering of a fish that was armoured below as well as above, a feature not recognized in any genus of the family hitherto described.<sup>2</sup>

As this fish—one of the oldest vertebrate animals known—presents points of structure of peculiar interest, I have in the following paper described its characteristics more at length than in previous papers, and given figures representing the form, arrangement and ornamentation of the plates. In this paper are also given descriptions of the several organisms found in the shales in which this fish occurs.

I.—DESCRIPTION OF THE SPECIES.

Hitherto all the fishes of this family have been spoken of as having plates on the head, back and sides only, but the one I am about to describe had a ventral plate as well,

<sup>1</sup> The term Silurian is used in this paper to distinguish the strata from the Llandovery to the Upper Ludlow, both inclusive.

<sup>2</sup> Since writing the above I have received from Dr. F. Schmidt, of St. Petersburg, Russia, a pamphlet describing a Silurian pteraspidian fish found in Silesia, in which pamphlet he speaks of a ventral plate, and refers certain fish plates described by Prof. Lankester as *Scaphaspis* to the position of ventral plates of pteraspidian fishes. From this it will be seen that Dr. Schmidt has taken the same view of the armour of the pteraspids as has been suggested by the author in this paper.



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In the course of the last two years several peculiar organisms have been found in the neighborhood of St. John by the author and by a member of the Natural History Society of New Brunswick, Mr. W. J. Wilson, which latter have been placed in the writer's hands for description. The following paper has been prepared to give expression to the remarkable features of these newly-discovered species.

A.—*Organisms of the Silurian System.*

DIPLASPIS ACADICA (Plate IV, figs. 1–4).

*Pteraspis Acadica*, Canadian Record of Science, Vol. II, p. 251.

*Diplaspis Acadica*, Bulletin of Natural History Society of New Brunswick, No. VI, p. 69.

In a short communication to the *Canadian Record of Science* (Vol. II, p. 251), the writer drew attention to the occurrence of peculiar fish plates in the Silurian,<sup>1</sup> rocks of the Nerepis Hills in Southern New Brunswick, referring them to the genus *Pteraspis*. Subsequently, on further examination and comparison, it was seen that these plates could not be those of a species of *Pteraspis*, though they belong to the family of which this genus forms a part. Nor could they be referred to any known genus of Pteraspidian fishes, owing to the fact that they formed the covering of a fish that was armoured below as well as above, a feature not recognized in any genus of the family hitherto described.<sup>2</sup>

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and in this respect corresponds to the remarkable armoured fishes (Placoganoids) of the Devonian age. The general form and size of these plates will be seen by reference to fig. 1 of the accompanying plate.

The plates on the left (*a*, *b*, *b'* and *c*) represent the main part of the dorsal covering; those on the right (*d* especially) the covering of the ventral surface of the head and thoracic parts of the fish. Plate *a* is the rostrum; *b* and *b'* are the lateral cornua; *c* the dorsal scute. The large plate (*d*) on the right was attached to the ventral surface, and may be called the ventral scute; *e* and *e'* are fragments of lateral plates which probably find their place behind the lateral cornua, as posterior lateral plates. There are two broken fragments of plates (*f* and *g*) in front of the rostral plate, whose place is not known.

Only two of these plates are complete—the rostrum and one of the lateral cornua—but the general form of the others may be inferred from the parts preserved, from the corresponding plates of other species and from the markings or sculpture of the parts of the plates that have been preserved. The analogy of these plates to the corresponding plates of known pteraspidian fishes cannot be doubted.

The plates were found spread out on a layer of shale in the attitude given in figure No. 1, which exhibits the interior view of all the principal plates; as though, after the death of the animal, the bucklers had been burst apart at one side, but still held by the cartilage at the other.

The most obvious character by which these Silurian fish plates can be recognized is a fine but very distinct ridging of the surface, the details of the ornamentation being governed by the position of the plates in the series of plates with which the body was covered.

The rostral plate, *a*, is marked by little ridges arranged parallel to each other and to the longer diameter of the plate, but transverse to the axis of the body of the fish. Toward the lower edge of the rostrum the ridges are less regular and anastomose, and at the lateral ends of the rostral plate these ridgelets are connected by irregularly placed cross-ridges, which give the surface of the plate in this part a reticulated appearance. The two anterior lateral plates or cornua, *b* and *b'*, also have parallel ridgelets that are parallel to the longer diameter.

In the dorsal scute, *c*, of which the anterior part is preserved in the specimen figured, the arrangement of the ridgelets which cover the surface is more complex. Near the anterior is a small tubercle, with a depressed or perforated centre (see fig. 1) enclosed within two ridges, which form an obovate border to it (see fig. 2—this part of the plate enlarged), the whole being somewhat elevated above the rest of the plate. This little tubercular elevation stood in an irregular oval space (see fig. 2), in which the ridges are more or less concentric to the elevation; at each side the border of this space runs out somewhat, marking the point where two grand sets of ridgelets meet, one from the anterior, and the other from the posterior end of the plate. Those in front of the oval space form a triangular area in which the ridges on the plate have their ends directed toward the tubercle, except at the front of the triangle, where they become transverse to the longer axis of the dorsal scute; all the ridges in this triangular area are irregular in their course, and frequently double upon themselves, or anastomose. There is no suture at the junction of the oval area with the triangular area, or the main part of the dorsal scute behind it, but



the ridges of the surface run across the border, and the oval area is, therefore, not a separate plate (see fig. 2). Behind the oval space the ridgelets are generally parallel to the longer diameter of the scute, and their extremities near the triangular area are looped, or return upon themselves, making an irregularly defined border across this part of the dorsal scute. The parallel ridges on the main part of the dorsal scute frequently anastomose.

In all that part of the plate which lies behind the triangular and the oval areas, one can distinguish two sets or ranks of the ridgelets, one finer than the other, there being about four or five of the more minute ridges between the larger ones; these larger ones are not continuous, but result from a greater prominence being given to certain of the minute ridges for a short distance. This two-ranked arrangement of the ridgelets does not characterize those close to the outer edges of the scute, which approximate in appearance to the ridgelets on the lateral plates, or cornua.

From the present form of this scute it would appear that it has been flattened in the shale, and that before compression it sloped downward in front from the oval area toward the rostral plate.

The little ridges which cover the surface of the ventral scute (fig. 1, *d*) are similar in their general arrangement to those of the dorsal scute, but present differences in detail; on the border of the plate there is a much wider space covered by parallel ridges of uniform size than are found on the dorsal scute; this band of uniform ridgelets is about half of the width of the lateral plates, and there is at the front end of the ventral scute a simulation of the triangular area at the front of the dorsal scute, but the ridgelets upon it are more irregular.

There is a greater lack of symmetry in the ridges on the ventral scute than on those of the dorsal, for the ridges on the right at the anterior end are not only looped, but somewhat coiled at their extremities, while those of the left side are looped and only slightly curved.

The fragments of plates *e* and *e'* (fig. 1) from their regular longitudinal ridges, appear to be parts of lateral plates, whose place is probably just behind the anterior lateral plates or cornua. There are some indications that these plates were connected with the ventral rather than with the dorsal scute.

The fragment *f* (fig. 1) differs from all the others in having the striæ concentric to one of its sides; it is possibly part of an ocular plate, but it is difficult to see where such a plate could be inserted at the side of the rostrum, which seems closely connected with the anterior lateral plates.

The relation which the several plates are supposed to have had to each other is represented in Plate IV, fig. 3, where the upper set of plates 3 and 3' consists of the dorsal scute and the series of plates that border it at the sides and in front; the dotted areas show the supposed extension of the deficient parts of these plates. The figure below is the fragment of the ventral scute, with the deficient part supplied in outline. The extent to which the plates are flattened is not known, but if they were strongly convex the two main plates would be narrower than they are here represented.

The fineness of the little ridges on the plates of the Acadian fish is quite as great as that of the fish-plates described in Prof. Lankester's paper, there being from 150 to 200 of them in the width of an inch. There is a considerable difference in the number of

striae on the different plates. The rostrum and the lateral plates have about six ridgelets to a millimetre, the dorsal scute about six and two-thirds, and the ventral scute about eight; on both dorsal and ventral scutes the ridgelets are somewhat closer on the sides than they are on the central part of the scute. The character and arrangement of these little ridges can be seen on the enlarged figure of the rostrum and adjoining plates. (See Plate IV, fig. 4.)

*Size*.—Length of rostrum, 5 mm.; width, 13 mm. Length of left cornua, 15 mm.; width, 5 mm. Length of right cornua, (part preserved) 11 mm.; width, 5 mm. Length of the part of the dorsal scute preserved, 14 mm.; width, 20 mm. Length of the part of the ventral scute preserved, 22 mm.; width, 15 mm.

*Locality*.—Cunningham Brook, Westfield, N.B., in a bed of black fissile shale, intercalated in heavy beds of dark grey siliceous shales.

*Horizon*.—Div. 2 of the Silurian Series.

## II.—RELATED GENERA AND SPECIES.

In considering the related forms of Pteraspidian fishes, none appear to correspond so closely to this species as the genera *Cyathaspis* of Lankester and *Palæaspis* of Claypole. Except that in our genus the lateral plates are divided into two parts, and that no orbital plates can be observed between the rostrum and the lateral plates, and that there is a ventral scute, there appears to be little difference between the first-named genus and this in the general arrangement of the covering plates of the body.

In Prof. Lankester's monograph of the fishes of the Old Red Sandstone,<sup>1</sup> we appear to have only one example properly referable to the genus *Cyathaspis*; for although *C. Symondsi* is described under this genus, it seems doubtful if it should be so placed, and Prof. Lankester appears to have referred it here provisionally. The typical species, *C. Banksii*, Huxley and Salter, is Silurian, and, as above remarked, possesses a set of plates quite analogous to those of the Acadian fish. There is also on the central plate ("dorsal scute") a rhombic tubercle (see Plate IV, fig. 6), which holds the place of a similar projection on the shield of the Acadian fossil. (See Plate IV, figs. 1 *c* and 2.) In Prof. Lankester's examples of *C. Banksii* the surface markings appear to have been obscure, except on the rostral and lateral plates; we do not know, therefore, how far the markings on the main plates of these two fishes were alike, but on the rostral and lateral plates they were similar.

In the genus *Pteraspis* there is a general analogy of parts to those of the Acadian genus, but the resemblance in details is not so close as that observable in *Cyathaspis*; in *Pteraspis* the rostrum is elongated, the lateral cornua appear to be anchylosed with the plates behind them, and the triangular area in the front of the tubercle on the dorsal scute in the former genus is wanting. There is, however, in this genus a small circular plate on the axial line between the rostrum and the dorsal scute which appears to correspond to the oval area on the dorsal scute in *Diplaspis*; if such is the case, the triangular area of the front of the dorsal scute in *Diplaspis* and *Cyathaspis* is suppressed in *Pteraspis*. Prof.

<sup>1</sup> Memoirs of the Palæontographical Society, London, 1868.

Lankester recognizes the analogy between the rhombic tubercle in *Cyathaspis* and the small circular plate in *Pteraspis*, but offers no conjecture as to the purpose of the latter.

When we compare our species with those of the genus *Scaphaspis* of Lankester, points of resemblance as close as those with *Cyathaspis* may be observed, but the resemblance is to the features of the ventral shield only, of the Acadian species. The characters of *Scaphaspis* are well represented by *S. truncatus* of the Downton Sandstone, which has the same two-ranked ridges on the central part of its scute, as *Diplaspis*, while, as in it, the borders are ornamented by ridges that are more equal in size; the ridges of the centre of the scute are also looped at the anterior end, as in those of the ventral scute of *Diplaspis*, leaving a small anterior area where the ridges are transverse to its longer axis, and in front of which the scute itself is truncated. There appears also to be a want of symmetry in the two sides of this scute at the anterior end, as in the similar part of the ventral scute of *Diplaspis*.

Prof. Lankester relies upon the peculiar two-ranked arrangement of the ridges of the scutes of *Scaphaspis* and *Cyathaspis* to distinguish those that belong to the Silurian age from those that are Devonian. Not only is there such a peculiarity, but the ornamentation of the scutes in the Devonian species is carried out upon a different plan from those of the Silurian.

From the preceding description and the figures given herewith, it will be seen wherein the peculiar ornamentation of the Silurian species consists. In the Devonian species of *Scaphaspis* the ornamentation is concentric to the elevated ridge on the posterior half of the scute, and the ridges run around the front of the scute in a regular manner, and are of about equal size. In the Devonian species there is also a set of ribs or moderately raised portions of the test, diverging from the front of the elevated ridge above referred to, to the anterior of the scute, and this part of the scute is more elongated than in the Silurian species. So radical are the differences between the ornamentation of the scutes of the Devonian species of *Scaphaspis* and those of the Silurian, that the two must belong to different genera.

But in the points in which the ornamentation of the scutes of the Devonian species of *Scaphaspis* differs from that of the Silurian, it agrees with the ornamentation of *Pteraspis*, and this genus also has the radiating ridges on the anterior end of the dorsal scute which we observe in the Devonian species of *Scaphaspis*. In both genera also the scutes grew by regular additions to the sides and anterior ends of the scutes.

In their form, therefore, their mode of growth and their ornamentation, the Devonian scaphaspid plates have the same relation to the genus *Pteraspis* that the Silurian scaphaspid plates had to the genus *Cyathaspis*, and we cannot but suspect that the scutes on which the genus *Scaphaspis* is founded are simply the ventral scutes of species of other genera.

In this view the analogy of the parts in *Diplaspis* to the Silurian genus *Cyathaspis* is clear and pronounced, though we find it to differ in the following respects: the lateral cornua or plates are in two pieces in place of one, and the ocular plates of *Cyathaspis* are apparently wanting in *Diplaspis*.

In comparing *Diplaspis* with the fish-plates (*Palæaspis*) found by Prof. Clappole in the variegated (Onondaga) Shale of Pennsylvania,<sup>1</sup> while there is a general resemblance

<sup>1</sup> Quarterly Journal Geological Society, London, Feb. 1885.

there are differences of ornamentation and form that show that the species at least are diverse. In *Palæaspis Americana* we appear to have a form of shield corresponding to the ventral scute of a Diplaspis, except that the front is more irregular and the plan of the striation different. Neither in Diplaspis nor in the English genera of Silurian fishes is there an arrangement of the little ridges of the surface of the scute similar to that represented as characterizing the central part of the scute of Palæaspis, in which no correspondence in the general course of the ridges to the longer axis of the plate is indicated. The want of symmetry observable in the two sides of the ventral scute in Diplaspis and in the English Silurian Scaphaspis is also apparent in *Palæaspis Americana*. Prof. Claypole's other species, *Palæaspis truncata* is founded, as he himself has observed, on a plate resembling the dorsal scute of Cyathaspis, and the association of the two plates in the same beds would suggest that they may be the dorsal and ventral scutes of the same species. The unique ornamentation of the test, as well as the differences of structure in the plates themselves, would indicate that they are of a different genus from the Acadian and the English forms; but they occur at nearly the same horizon.

The genera of Pteraspidian fishes<sup>1</sup> known to the writer are the following:—

PALEASPID, *Claypole*.—Scutum simplex, ovale<sup>2</sup>—*Silurian*.

SCAPHASPID, *Lankester*.—Scutum simplex, ovale—*Silurian* and *Devonian*.

CYATHASPID, *Lankester*.—Scutum in quatuor partes divisum, ovale—*Silurian*.

DIPLASPID (gen. nov.)—Scuta in dorso et pectore in septem (?) partes divisa, ovalia—*Silurian*.

PTERASPID, *Nur*.—Scutum in septem partes divisum, sagittiforme—*Devonian*.

### III.—GEOLOGICAL HORIZON.

From various considerations it appears that these fish remains are of greater antiquity than was at first supposed. This may be judged from the aspect of the Silurian series in various parts of Acadia and Gaspé. Near the latter district, in the island of Anticosti, are Silurian limestones, referred by the late Mr. Billings to the Silurian, as follows:—

	Feet.
DIV. 1.—Grey and yellow limestones (Lower Llandoverly).....	306
DIV. 2.—Grey limestone and dark grey bitumenous limestone (Llandoverly).....	447
DIV. 3.—Grey and brown shale; grey and drab argillaceous and bitumenous limestones (Llandoverly).....	540
DIV. 4.—Light grey granular limestone (Llandoverly).....	69
	—
	1,362

On the mainland of Canada, opposite to Anticosti, is the Gaspé series, which is chiefly Devonian, but has at the base limestones referred to the Lower Helderberg group. No beds of the Niagara period appear in this district, but they are to be found at the head of Bay Chaleurs as a part of the Silurian series. The Lower Helderberg group, therefore, appears to be connected in this district with the Devonian series.

<sup>1</sup> The diagnoses of the second, third and fifth genera are taken from Prof. Lankester's memoir cited.

<sup>2</sup> Quart. Jour. Geol. Soc. London, Feb. 1881. This genus is separated from other Pteraspidian fishes, on account of organic differences in the structure of the plates, and not because of difference of form.

At Arisaig, in eastern Nova Scotia, is a section of Silurian rocks which, owing to the fauna which it contains, has been studied with much care. These consist of:—

	Feet.
A—Grey argillaceous and arenaceous shale.....	200
B—Dark shales and ferruginous shales.....	170
B'—Shales more compact than B, and of a lighter color.....	} 500
C—Shales harder than the last, and more calcareous.....	
D—Grey and colored shales, with limestone bands.....	870

The first of these was referred by Dr. Honeyman, some years ago, to the Mayhill Sandstone, the second to the Lower Ludlow, the third to the Amestry Limestone, and the fourth to the Upper Ludlow. In a late publication he has revised this opinion, and would regard *A*, *B*, and *B'* as Medina and Clinton, or in part of Hudson River age. This would bring his determination of these beds in accordance with Mr. Billings' results in the Island of Anticosti. Further information on the age of these beds may be gathered from the Acadian Geology,<sup>1</sup> where it is said that "the general assemblage [of fossils] in the Group *D* is, on the whole, not unlike that of the Clinton, but is of such a character as to warrant the belief that we may have in these beds a series somewhat higher in position."

In southern New Brunswick there is a series of measures of Silurian age, in which the succession is, lithologically, not unlike that at Arisaig. On Passamaquoddy Bay the following succession has been observed:—

	Feet.
Div. 1.—Hard grey and olive grey slates argillites.....	400
Div. 2.—Black and dark grey siliceous shales, with very distinct alternating color bands in the lower half.....	620
Div. 3.—Grey sandy flags and shales.....	350
Div. 4.—Greenish and reddish sandstones and shales.....	310
Div. 5.—Dark porphyritic red felsite.....	300
	1,980

The beds in the middle of this series, as at Arisaig, consist of finely laminated dark grey and black shales, and although no fauna has yet been found in them that will definitely fix their horizon, it is approximately determined by the fauna of Div. 3. This has been examined by Mr. H. M. Ami, of the Geological Survey of Canada, and found to correspond to that of the Niagara group.<sup>2</sup>

Thus, in three districts of Acadia, the lower measures of the Silurian series are represented by bitumenous shales and limestones to the north, and dark carbonaceous shales to the south, which presumably are contemporaneous, and which, by their fauna, so far as it is known, are of the age of the Clinton group. It is in this part of the series (Div. 2) that the fish remains described in this article were found. They occur in the mass of strata included in the 670 feet mentioned in the section at page 165 of the Report of the Geological Survey of Canada, 1870-1.

<sup>1</sup> Page 556.

<sup>2</sup> From earlier and less complete collections of the fossils of this division, the late Mr. E. Billings referred it, about eighteen years ago, to the Lower Helderberg horizon. The period marked by Divs. 3 and 4 was one of transition with elevation of the sea-bottom, accompanied by volcanic disturbances. Thus resulted much local variation of the fauna, so that the exact age of these divisions (and of Div. 5 which is local), is still open to question.

## CERATIOCARIS, McCoy.

A species of this genus, or of *Phinocaris*, Clarke, remarkable for its small size, occurs with the fish remains above described.

## CERATIOCARIS PUSILLUS, n. sp. (Plate IV, fig. 9.)

*Carapace*.—Oblong, somewhat wider in front than behind. Back arched upward at the anterior end, straight behind; beak bent downward from the line of the back, nearly one-sixth of the length of the carapace, narrow and sharp-pointed; front margin of the carapace gently rounded down to the ventral, which is moderately convex; abruptly rounded at the posterior end below, and arching forward and upward joins the back with a reversed curve, forming a distinct angle.

*Abdomen*.—Having four joints exsert; the joints are wider than long, and to the last segment is joined a long slender telson, and slender stylelets of less length; the needle-like telson is as long as the carapace, exclusive of the rostrum.

*Length*.—About 30 mm.; width, 5 mm. Length of carapace, 15 mm.; width, 5 mm. Length of exsert part of the abdomen, 4 mm.; width, 2 mm. Length of the telson, 13 mm.; width at the base,  $1\frac{1}{2}$  mm.

*Horizon and Locality*.—This little species occurs in myriads in the black fissile shales of Div. 2 of the Silurian succession at Cunningham Brook, Westfield Station, N.B.

This species is of interest partly on account of its antiquity and partly because of its small size, as well as its peculiar form; for in its narrow shield and long acuminate rostrum it differs from all others.

*Ceratiocaris* has a number of representatives in the Lower Helderberg rocks, but the greatest development of the genus is in the Devonian system. The finding of a species so low down as Div. 2 of Silurian series, which by its fauna appears to be of the age of the Mayhill Sandstone, is therefore of some importance.

## BUNODELLA, n. gen.

This form until better known is referred to a group of crustaceans which includes Hemiaspis and others, once referred to the Eurypteridæ, but later by F. Smith made a separate family, and now by A. S. Packard made a suborder under the name of *Synxiphosura*. As only one species is known, the description of the species will stand for the genus.

## BUNODELLA HORRIDA, n. sp. (Plate IV, fig. 8.)

*Body*.—Ovate-elongate, trilobed longitudinally. Only the head and thorax known.

*Cephalic shield*.—Subtriangular with rounded angles. Composed of a glabella, fixed cheeks and moveable (?) cheeks. Glabella broadly cylindrical and rounded in front; it occupies nearly half of the width of the head shield, and more than half of its length. The fixed cheeks are expanded in front as in *Asaphus*; attached to the outside of the fixed cheeks are ear-shaped lateral lobes, defined by an impressed line, which appear to

have been movable. The eyes are unknown, and no articulation between the thorax and head shield has been observed.

The thorax has seven segments preserved, and consisted of an elongate cylindro-conical body, having triangular lappets or pleuræ attached at the sides. The abdomen, or terminal extremity of the body, is unknown.

*Sculpture*.—The axis of the body is covered everywhere with a rough coating which appears to consist of minute appressed spines, directed backward; these obscure the articulations so that the segmentation of the body is seen only in the pleuræ; these little spines are seen also on the fixed cheek and the front of the head; this hirsute covering is not found on the pleuræ, nor on the moveable (?) cheeks.

*Length* of the parts preserved, 30 mm.; width, 18 mm. Length of cephalic shield from the basal sinus, 10 mm.; width, 18 mm. Length of thorax, 20 mm.; width of anterior end, 18 mm.; or posterior end, 10 mm.

*Horizon and Locality*.—In the black fissile shales of No. 2 of the Silurian, near Westfield Station, N.B., in company with *Diplaspis Acadica* and *Ceratiocaris pusillus*.

The three anterior pleuræ, which are defective in the example figured, have been restored as if they were of the same form as the posterior ones. They may, however, have approached more nearly in form to the movable (?) cheeks (or lateral lobes) of the cephalic shield.

The genus may be compared to *Bunodes*, Eichwald, in the tuberculated surface, and the peculiarities of the lateral appendages of the carapace; for although no pleural grooves have been observed, these appendages are so set as to overlap, in an imbricate manner, the back of each pleura overlapping the front edge of the one behind it. But *Bunodes* differs from this genus in having a larger cephalic shield, and in having one segment less in the thorax; the three parts of the body are also more distinct. In the smaller head and the triangular pleuræ our species resembles *Exapinurus*, Nieszk, rather than *Bunodes* proper, but cannot well be compared in other respects. Were it not for the peculiar form of the head, the separate pleuræ and the obscure segmentation of the axis, our genus might be compared with *Pseudoniscus*, Neiszk, which it resembles in general outline and in the regular tapering of the posterior part of the body.

In addition to the above species there occur with these fish-plates a few examples of a peculiar organism apparently related to the graptolites. It consists of a rather thick rod apparently having cells along its sides, and the orifices of these cells have long spinous processes attached to them. An example of this fossil has been sent to Prof. Charles Lapworth, but no report of its nature has been received.

#### B.—Organisms of the Devonian System.

These are three: the wing of an orthopterous insect, a chitinous grub, and a peculiar little crustacean. The first organism may be described under the name of

#### GERONEURA WILSONI, n. gen. et sp. (Plate IV, fig. 10.)

The anterior wing of the body (the only part known) is elliptical elongate, the venation strongly marked and the scapular ridge conspicuous.

The marginal vein is distinct but not prominent, and runs along the front margin.

The mediastinal vein for most of its course runs close to the scapular, but curves outward at the extremity; its length is more than one-third of that of the costal edge.

The scapular vein and its branches cover a triangular area terminating at the apical end of the wing. The main scapular hardly reaches the apical extremity, but terminates near the end of the costal edge.

The main scapular branch parts from the main vein not far from the origin of the latter, and at one-third from the same point throws off a branch from the lower side, which without branching goes directly to the lower part of the apical edge. About half-way from the base of the scapular branch another vein is thrown off from the lower side, and forks at a short distance from the apical edge opposite the tip of the wing. The scapular branch itself forks close to the apical edge near its upper part.

The area covered by the median veins is elongately rhombic. The externo-median vein throws off two branches, of which the first is stronger than the main vein at and some distance from its origin, but fades away and becomes indistinct long before reaching the margin of the wing.

About one-quarter of its length from source the externo-median vein throws off a second branch, which goes with a sinuosity toward the base of the apical margin, and nearly touches it. At nearly two-thirds from its extremity this branch throws off a faintly marked vein on the lower side. The rest of the externs-median vein is straight.

The three remaining veins are simple, short and straight, and are directed toward the internal margin of the wing. The subexterno-median originates near the externo-median, and is about two-fifths of the length of the latter. The interno-median is about two-thirds of the length of the subexterno-median. The anal vein is about half of the length of the interno-median, and the anal area is quite small.

The nerves in this wing are remarkably regular and simple, those in front of the scapular vein and between the scapular and the main scapular branch are obliquely directed forward and outward, but the remainder of the nerves are transverse. The nerves between the two main branches of the externo-median vein show a tendency to throw off branches backward and outward, and there is a faint tendency to a reticulate arrangement on the smooth space near the inferior margin, below the second branch of the externo-median vein. But over the greater part of the wing the nerves are directly transverse between the veins.

The importance of the scapular vein and its proximity to the costal margin appears to indicate that this is an anterior wing; and the elevation of the scapular vein marks it as a right wing.

The remarkable simplicity of the venation in this wing distinguishes it from all the other Devonian insect wings, which are sufficiently perfect to exhibit clearly the character of the venation. Of these wings it seems to be most nearly related to *Xenoneura antiquorum*, but it is more simple in the plan of its venation.

Among Carboniferous insects there is one, *Hemeristia occidentalis*, which in the plan of the venation is similar to this species (*G. Wilsoni*), but in the carboniferous species the veins are more numerous and more frequently forked. If, however, the plan of venation be considered, our species may be referred to the Hemeristinæ rather than to any other Palæozoic family of insects; and of the four sections into which Dr. S. H. Scudder



divides the order Palæodictyoptera of Goldenberg, it seems plainly to fall in the second, viz., Neuropteroidea.

*Size*.—Length of the part preserved, 16 mm.; probable length of the whole wing, 16½ mm.; width, 6 mm.

*Horizon and Locality*.—This species was found by Mr. W. J. Wilson in the Plant-bed No. 2, Cordaite Shales of the Lower Devonian series at Lancaster, N.B.; the bed in which the late Prof. C. F. Hartt found *Xenoneura antiquorum*.

ARCHÆOSCOLEX CORNEUS, n. gen. et sp. (Plate IV, fig. 11.)

Body cylindrical, tapering behind the middle, and also at the three anterior segments. Divided into three regions of head, thorax and abdomen.

Head small, somewhat conical, appendages not known.

Thorax of three joints, increasing in width backward, but decreasing in length. Limbs tapering, the posterior pair as long as the thorax and larger and stronger than those in front; the two anterior pair slighter and partly concealed beneath the thorax and head.

Abdomen of eleven visible segments; those at the anterior end are widest, those of the middle longest. Five segments only are complete; of these the basal segment has an oblong scar near the posterior edge; from this scar there extends across the other four segments a very faintly marked band, pointed at the end, and having a duller surface than the rest of the surface of the rings.

The crust is chitinous, and its surface has a faint brownish tinge, and appears to be minutely punctate.

*Size*.—Length, 20 mm.; width, 3 mm. Length of the head (as preserved), 1½ mm.; width, 1½ mm. Length of thorax, 5 mm.; width, 3 mm. Length of abdomen, 14 mm.; width, 3 mm.

*Horizon and Locality*.—From plant bed No. 2 in the Cordaite Shales, St. John, N.B. Found by Mr. W. J. Wilson.

There are some features in this organism which do not seem easy of interpretation; among these is an oblong scar, which is found on the fifth segment; this is in the position where a spiracle might occur, as is the case with the larva of several insects; but these spiracles are usually nearer the anterior edge of the segment than is the case with this scar. If on the other hand we look upon this scar as marking the point of attachment of a wing, we find no legs on this segment beneath the wing attachment marking it as a part of the thorax; and further there is no scar on the segment in front to mark the place of an anterior wing. It may be remarked, however, that there is a dark band extending backward from the scar on the fifth segment, along the side of the body, which may be due to the impression of an embryo wing-sac; this band does not show on the fifth or anterior segment.

This grub is the first example of the body of an insect recognized among the insect remains found in the Devonian shales at St. John. That it is such and not a crustacean seems clear from its general aspect and from the position and nature of the appendages. The specimen is a little broken at the front, so that there may have been appendages to

the head and additional joints to the limbs, beyond what has been preserved on the stone. The slate is also flaked off at the posterior end of the fossil, which may have had other joints beside those preserved.

Among living insects the caddis-worm is one which appears to come near to this larva in form. Several examples of rather thick organisms, which are short, curved or bent, have been found in the plant bed at St. John; these are similar in size and appearance to the object herein described, but they have rough surface and do not show any trace of segmentation; these may possibly have been cases for larva similar to the caddis-worm. A larva thus protected, however, would not require the strong chitinous covering which this species possessed. On the whole, therefore, it seems most probable that it belonged to an insect similar to those known to have been living at the time by the detached wings already discovered in these plant beds.

*EURYPTERELLA ORNATA*, n. gen. et sp. (Pl. IV, fig. 12.)

Minute. Body ovate-elongate, obscurely divided into three regions, and also faintly trilobed longitudinally by impressed lines near the margin. Apparently furnished with a pair of large limbs.

Head triangular, rounded at the outer corners, and emarginate behind on the median line. Seemingly composed of three anchylosed segments, of which the first is quite narrow, the second double the width of the first and emarginate behind; as is also the third, which is much wider than the second.

Thorax subquadrate, composed of four segments, of which the first is a double segment produced by the union of two rings, the elements of which are nearly obliterated; this segment has an elevated ridge on the mesian line. The three posterior segments are progressively narrower and shorter, and the ends are rounded forward.

The abdomen is elongately triangular, and consists of several segments; of these the first three have a firmer texture than the others, which form a long flexible tail, and are but faintly indicated on the stone.

At the side of the body there appear a few joints of a limb, which apparently was attached to the last segment of the head. The extremity of this limb, which is but poorly preserved, was broad and flattened.

*Ornamentation*.—This consists of rows of tubercles arranged along the posterior margin of the segments, on each side of the median line. The tubercles of the first segment of the head are quite obscure, and those of the second not distinct; on the succeeding segments there are in order 4, 5, 5, 4, 4, 3, 2 and 1 tubercles on each side of the mesian line respectively, as far as the third segment of the abdomen.

The crust is very thin, and not so distinctly chitinous as in the preceding species.

*Size*.—Length, 8 mm.; width, 4 mm. Length of the limb, 4 mm.

*Horizon and Locality*.—From Plant Bed No. 2, Lancaster, N.B. Found by W. J. Wilson.

This is one of the most puzzling forms met with in the Devonian plant beds. It is here referred to the Crustacea, but no known crustacean of similar antiquity has such a head as is here represented; the front, however, is poorly preserved, and there is doubt

of the correctness of the outline at that part. If a crustacean, the head has more affinity to that of the Synxiphosuridæ than the Eurypteridæ, as may be seen by comparison with *Exapinurus* and *Pseudoniscus*; and this relationship is also better borne out by the tapering caudal segment.

But, on the other hand, if we consider the union of the two rings which compose the first segment of the thorax, the absence of pleuræ and the probable possession of a pair of large limbs attached to the last segment of the headshield we observe characters which mark the Eurypteridæ. Neither *Eurypterus* nor *Pterygotus*, however, had a crust similar to this species, and it differed from both in its minute size and probable fresh-water habitat. The size corresponds better to the Synxiphosuridæ.

This organism was found among fragments of plants that show scarcely any marks of maceration, and which have rare insect remains scattered through them; it might, therefore, be surmised that it has been the larva of some insect, such a larva, for instance, as some water-beetles have,<sup>1</sup> and with this the small size of the object, and also that of its anterior segment, agree; but the division of the body segments into two regions and the probable presence of limbs are objections.

On the whole it appears more correct to regard this organism as a type of fresh-water crustacean intermediate between the Eurypteridæ and the Synxiphosuridæ.

#### GEOLOGICAL AGE OF THE INSECT REMAINS.

This was determined some years ago by Sir J. W. Dawson upon the evidence afforded by the plant remains of the beds in which these insects occur. From the first collections made, Sir William supposed the age to be Upper Devonian; but his more mature opinion, based upon the study of the large collections made by the late Prof. C. F. Hartt and myself from these beds, and placed in Sir William's hands for study, and of collections from Gaspé, etc., was that these plants were of Middle Devonian age. The following descending series, in which unconformities are marked by a dividing line, show their relative position in the Devonian system.

Of these divisions the Bloomsbury conglomerate is variable in thickness, and not known in the central counties. The break between the Cordaite Shales and Mispéc series is most clearly shown in Charlotte County, where this series rests upon the Silurian, and has boulders composed of the fossils of the Silurian. The second unconformity is shown in the same county by nearly horizontal Perry sandstone resting upon highly inclined Mispéc conglomerates. The three series represent a great lapse of time, probably the whole Devonian Age.

Devonian of St. John Co.	{	Perry Sandstones, with Upper Devonian flora, according to Sir J. W. Dawson, but lithologically resembling the Lower Carboniferous Sandstone.
		Mispéc Conglomerate and Slate.
		Cordaite Shales and Flags, Middle Devonian flora. <i>Insect remains</i> (in oldest beds of the Cordaite shale.)
		Dadoxylon Sandstone (with an older Devonian flora, <i>G. F. M.</i> )
		Bloomsbury Conglomerate, etc.

<sup>1</sup> See larva of *Elmis* in Packard's Guide to Insects, p. 450.

## EXPLANATION OF THE PLATE.

- FIG. 1.—*Diplaspis Acadica*. Natural size, presenting the interior view of the plates.—*a.* the rostrum; *b b'* the lateral cornua; *c.* the dorsal scute; *d.* the ventral scute; *e, e'* plates behind the lateral cornua; *f.* fragment of a plate, perhaps an ocular plate; *g.* fragment of a plate, the position of which is not known. Silurian.
- FIG. 2.—Same species. Enlargement of the oval area of the dorsal plate, showing the ornamentation. Mag.  $\frac{1}{1}$ .
- FIGS. 3 and 3'.—Same species. Restoration of the known plates to their supposed position in the dorsal and ventral covering. Natural size. The letters have the same signification as in Fig. 1.
- FIG. 4.—Same species. Enlarged view of the inside of some of the principal plates as they appear in the shale Mag.  $4\frac{1}{2}$ . The letters have the same signification as in Figs. 1 and 3. This figure shows the character of the ornamentation.
- FIG. 5.—*Pteraspis rostrata*. Outline of the plates of this species. Reduced,  $\frac{1}{2}$ . (After Lankester). Devonian.
- FIG. 6.—*Cyathaspis Banksii*. Showing the form and arrangement of the plates. Natural size. (After Lankester.) Silurian.
- FIG. 7.—*Scaphaspis truncata*. Showing the form and arrangement of the ridges of the surface. Natural size. (After Lankester.) Silurian.
- FIG. 8.—*Bunodella horrida*, n. gen. et sp. Nearly complete. Natural size. Silurian.
- FIG. 9.—*Ceratiocaris pusillus*, n. gen. et sp. Restored. Mag.  $\frac{2}{1}$ . Silurian.
- FIG. 10.—*Geroneura Wilsoni*, n. gen. et sp. Mag.  $3\frac{1}{2}$ . Devonian.
- FIG. 11.—*Archæoscolex corneus*, n. gen. et sp. Mag.  $\frac{2}{1}$ . Devonian.
- FIG. 12.—*Euryptereila ornata*, n. gen. et sp. Mag.  $\frac{1}{1}$ . Devonian.

*V.—Notes on the Nova Scotia Gold Veins.*

By E. GILPIN, JUN., A.M., F.G.S.

(Read May 28, 1888).

In this connection I need not dwell upon the age, extent, and general geological features of the Nova Scotia gold fields, as they have been referred to already by several writers, and the labors of the Geological Survey will in a few years present the public with full particulars on all these points.

At first it was believed that the gold-bearing quartz bodies were properly classified as beds, as they conformed to the bedding of the strata; but now the general opinion is that they were, roughly speaking, contemporaneous with the foldings which characterise the district I am referring to, and that, occupying lines of minimum pressure along the anticlinals, they are bedded veins. The consideration of this view lends an interest to them when they are observed, under these conditions of formation, to present many of, if not all, the characteristics of fissure or "cross-country veins."

The last report of the Canadian Geological Survey on the work done on the eastern part of Nova Scotia, divides, in accordance with the views of Mr. John Campbell, the auriferous measures into two conformable groups:—

- (1) Upper or graphitic and ferruginous slate group.
- (2) Lower or quartzite group.

The upper group contains little beyond varieties of slate, often highly metamorphosed, graphitic, ferruginous, and talcose, and is at least 4,000 feet in thickness.

The lower group is made up of alternations of varieties of slate with beds of compact quartzite, and is, according to the report, about 11,000 feet thick. About the middle of the section, in the eastern districts, the slates are most numerous; and they carry the greatest number of auriferous veins about the middle of the section.

It is noticeable that this great mass of sediments is very decidedly non-calcareous, a few beds only at different points showing the presence of calcic carbonate, which it should be noticed is also not a prominent ingredient in the veins.

The section holding the gold-bearing veins does not differ from those above and below, except that the slates are perhaps more prominent, and the quartzites finer grained. The veins vary in thickness from one half an inch up to six feet, and are very numerous, a section of 850 feet at Mount Uniacke showing thirty-one veins. It has been observed that the relation of the auriferous strata to the overlying slate group is similar at many points. But I believe Mr. Faribault is the first to present the true horizon of the auriferous portions of the lower group. From his measurements it lies at a distance below the upper group of about 2,800 feet, and extends down to a depth of about 8,000 feet.

Considering the foldings of the strata vertically as well as horizontally, the depth of

the ground permitting the formation of veins would be measured by the line where the pressure in the synclinals counterbalanced the relief afforded by the anticlinal elevations. Whatever approximation theoretical calculations may allow to this line, in view of the thickness of the strata concerned in these movements, it may safely be assumed that it is at a depth beyond the present reach of the miner. Mr. F. B. Bulkely in a paper read before the Philadelphia (1884) meeting of the American Institute of Mining Engineers on the intrusive bedded felsite dykes of Leadville, Colorado, puts this view as follows:—That the application to rock beds of a tangential pressure leads not only to their folding but to their partial separation, and in this connection gravity becomes an important factor.

The following figure, taken from his paper, represents an ideal anticlinal fold produced by the horizontal force  $PP$ . Thus the resultant  $P'P'$  of this force as applied at  $O$  and  $O'$ , shows an uplift applied equally to all the strata, which is consequently exerted with increasing effect upon the uppermost sheets, causing a tendency to separation of the strata. The force of gravity is represented by  $GO, GO'$ , and it is evident that at the

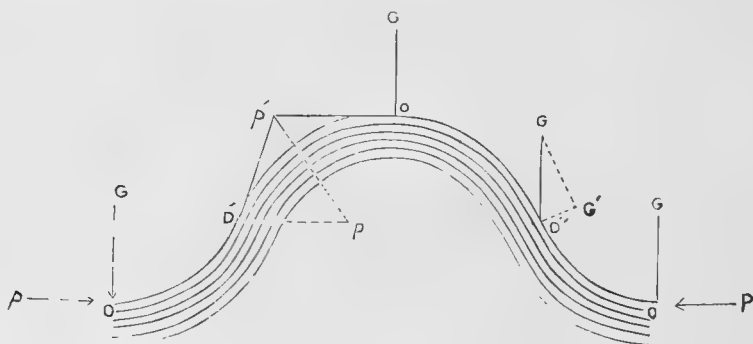


FIG.—An ideal anticlinal fold.

summit and at the foot of the anticlinal, as at  $OO$  this whole force is exerted in a direction at right angles to the bedding planes of the structure, its whole effort being exerted to prevent a separation of the strata, while at other points, midway between the foot and summit, at  $O''$ , the force thus exerted is much less. An analysis shows that the force exerted at right angles to the plane of the stratification is directly proportional to the cosine of the angle of dip, and is represented by  $G'O''$

Stratigraphically, the Nova Scotia veins conform to the conditions implied in such foldings. The present surface of a gold field may be represented as a horizontal section of an anticlinal, in some cases drawn near to its apex, but frequently so low down as to expose nearly all the beds of the gold-bearing horizon. Mining explorations in numerous districts have shown that veins, several inches thick at the surface, gradually thin and disappear within short vertical distances, that "cross cuts" driven at various depths below the surface have intersected veins which did not outcrop, and that some few veins have maintained nearly uniform dimensions to depths varying from 300 to 700 feet, the maximum depths as yet attained in our workings. The lateral thinning out of a vein is often seen to be succeeded by the commencement of another a few inches or feet to one side of the line of its course, as well as the passage more or less abrupt of the plane of a vein through a bed of rock to resume again its normal dip. Similarly, veins have been known to turn almost at right angles across the strata for a distance of a few feet or yards,

and then to resume their regular course. It may be noted that these last-mentioned irregularities are generally accompanied by changes in value. Incidental to the flexures of the strata are irregularities in the dimensions of the veins, corrugations of the walls, cross leads, feeders, etc.

It need not, however, be assumed that the movements of the strata were either abrupt or continuous, rather they were slow and intermittent. The filling of the fissures was, generally speaking, continuous, and as each opportunity was offered the process of vein-deposition began. The relative dates of the secondary disturbing forces cannot be given, but the latest known evidence of marked action in the province is the Triassic trap of the Bay of Fundy, which apparently did not affect the auriferous measures lying a few miles away from it.

The fact that the auriferous measures of Nova Scotia are at many points interrupted by masses of granite, has been frequently referred to as having a direct bearing on the metalliferous values of the veins. It is known that in several cases the gold-bearing veins butt against granite, but under such conditions no change in their values for better or for worse has come under the writer's notice. The granite protrudes in the strata with comparatively little disturbance, having, as it were, melted its way through. The evidence is in favor of the granite being later than the foldings, although it has frequently pressed itself along the bedding planes for considerable distances. This view is borne out by the sections at Mosseland, near Tangier, at Country Harbor Narrows, etc., where the proximity of the granite has not affected the values of the veins. The varying proportions of sulphides of iron, copper, lead, zinc, etc., under these conditions, not being marked by a predominance of any particular mineral. Nor is the quartz filling changed from its normal character beyond any slight variation due to metamorphism of the small percentages of lime, etc., commonly occurring in it. In this connection the summaries given by Von Cotta in his "Treatise on Ore Deposits," offer a striking contrast.

The granite itself has not yet yielded any noticeable metallic deposits, although frequently holding irregular veins, filled with quartz, felspar, etc.; nor have any contact segregations been observed near it. An exception, however, to this rule is noticed at Dalhousie, Queen's Co., where copper ores occur in veins in granite. The intrusive dykes, etc., of the neighbouring Devonian, on the contrary, are frequently associated with metallic deposits.

This fact may, perhaps, be safely brought forward to explain the surprise of miners from abroad when they find that the ground close to the granitic masses and dykes does not prove specially metalliferous. In Cornwall, for example, the strata have been elevated by the granites, not inaptly described as now protruding like islands, and mantle round them. The granites penetrate the slates much as they do here, and present them usually with greater degrees of metamorphism, and the metalliferous values of the strata appear to be due to the "Elvans," as already noticed in the case of the Nova Scotia Devonian in some localities. But in this province, the granites, presumed to be later than the strata of Oriskany age which they penetrate and metamorphose at Nictaux, were not accompanied or followed by the enriching dykes such as are found in the Devonian of Salmon River, Lochaber, Polson's Lake, etc., a few miles to the north of the gold measures.

When these veins are considered as unaffected by the proximity of granite, and as surface veins not penetrating to underlying and possibly metalliferous strata, it would

appear that the vein matter has been derived from the measures encasing them. The cross veins have not been the means of introducing the minerals, for they, as well as the faults, are observed to shift and break veins already mineralised, and they seldom exert any appreciable effect on their values. The former not unfrequently show the gold caught in the breaks as smoothed out or "slickensided" plates. In a specimen from the Albion Mine at Montagu, where a break had intersected a very rich portion of the vein, the smoothed plate of gold had a superficies of several square inches, and a thickness of about one quarter of an inch. The knowledge of these facts has in some districts prevented the expense usually incurred when breaks of the strata are met, for the inclination of the pay ground being known, the barren portions of veins could be avoided.

To the miner, the most interesting and important point about a vein is its "pay" ground. When it is considered that the thickness of the worked veins averages from three to ten inches, and that their values vary from one quarter of an ounce to five ounces of gold to the ton, it is evident that he will make little profit unless his workings extend into the richer zones, carrying over considerable spaces an approximation to the higher values. I believe that in this province scarcely any veins have been tested even superficially, unless they showed at their outcrop rust or some of the more common sulphides, so accepted has become the axiom that otherwise there is no gold in them.

The metallic compounds characterising the veins are sulphides and arsenides of iron, galena, blende, copper pyrites, oxide of iron, copper glance, native copper, molybdenite, etc., found more or less disseminated throughout the vein, with small amounts of gold. At certain points, following the lateral extension of a vein, are met zones where these compounds are more abundant, and the gold is concentrated. As many as four of these rich zones or "chimneys" have been observed on a nearly straight line forming the axis of one or more veins. In a few instances, two distinct "pay streaks" or chimneys have been met in the same vein.

The zones occupy longitudinally in the veins a space varying from a few feet up to several hundred feet. Transversely, the vein is not affected in width by their presence, although sometimes the slate wall contains feeders and nodules of quartz rich enough to crush. The zones sometimes pass abruptly into poor quartz, yielding from a trace up to two pennyweights, or the percentage of gold gradually diminishes until mining becomes profitless. It has been observed that when a zone "takes" in suddenly on one side, it diminishes gradually in value as the workings approach the other side, but this can hardly be given as the rule. The shape of these pay streaks is extremely irregular; they have, however, in all cases a decided dip, which is generally the same for all those occurring in a given district. Thus they dip to the east at Oldham, Uniacke, Waverley, and Isaac's Harbor, and to the west at Montagu, Lawrencetown, and Renfrew.

The accompanying sketch <sup>1</sup> of the workings in a pay streak at Montagu will serve to show the irregularity of their form and the general dip. Mining was discontinued at the lowest portion when the quartz ceased to yield a profit, although the percentage of gold was still decidedly greater than in the surrounding quartz.

In the Albion Mine at Montagu, the vein was little mineralised, but whenever copper

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<sup>1</sup> Sketch from paper on Nova Scotia Gold Fields, read before the North of England Institute of Mining Engineers by the writer.



pyrites was met gold was found in its vicinity, some lots of quartz yielding 50 oz. to the ton. These finds were followed by barren intervals, so that the limits of the pay streak which extended over several hundred feet, comprised poor quartz, holding rich local accumulations. In other veins in the same district, arsenical pyrites predominates, and the gold occurred both free and enclosed in the mispickel. In other veins the same eccentricity of occurrence has been observed. Thus at Oldham, a lead yielded one nugget of 60 oz., and a considerable expenditure showed only barren ground.

When the relation of these rich zones is studied, it is found that no rule guides their connection with the surrounding strata. In common with all opened sections of veins frequent "feeders" of quartz are thrown out, and often parallel veins obliquely cutting the strata intersect or unite with them. As a rule the intersecting or uniting veins are not themselves auriferous or prove enrichers; the feeders when directed into bodies of rock not intersected by veins are often auriferous. In one case a vertical cross lead or feeder, some fifty feet long, turned and ran east in a bed of slate, dividing into three veins. These three veins were not rich, while the cross lead yielded handsome returns to a considerable depth when it pinched out. The size of the vein does not affect the presence of the pay chimneys, a vein not exceeding one-half an inch in thickness, having yielded very good returns over a considerable space. An instance has been noted where, at a considerable depth, accident revealed at a distance of a few inches from a worked lead, a thin, parallel vein of quartz having a superficies of a few hundred square feet, and so far as observed totally unconnected with it, but richly charged with gold.

It not unfrequently happens that the workings of a mine embrace in a width of two or three feet, two or more parallel leads, one of which only is valuable. Here, apparently there have been successive openings, only one of which had directed to it the gold-bearing agencies. The contemporaneous filling of fissures as they opened one after another would, possibly, explain the last two cases.

The theory of the undulations would assume that, near the anticlinal, axis the veins would prove, comparatively speaking, larger and more persistent. The well-known Dufferin Mine of Salmon River, Halifax Co., is a good example of this. It is situated near the axis of the district, and its width varies from two to twelve feet, and at its eastern end where it attains its maximum thickness it forms two "Saddle Backs" branching out as it goes down. From this mine, which has been worked horizontally about 1,200 feet, and vertically about 250 feet, about 55,483 tons of quartz have been taken out, yielding 27,814 ounces of gold, the average yield per ton varying from five penny-weights to two ounces to the ton, and no pay streak being recognised. It has also been remarked of several districts, where the foldings have been pushed to cause overturns of the strata, that the veins are, as regards size and persistency, best adapted for mining.

In a few cases leads of moderate size have been traced on the surface for several hundred feet, and have yielded at all points on their course, amounts of gold constant but not large enough to tempt the miner's ambition. There are also met in numerous districts large veins of compact milky quartz, containing little mineral matter, and yielding to the stamp mill no returns. These veins are probably among the latest products of the foldings, and serve to complicate the study of the subject, unless it be conceded that some essential of heat, time, etc., by its absence or presence, prevented the accretion of the metals, etc.

The preceding remarks have had reference exclusively to the veins which, so far as our mining experience has gone, rival in eccentricity of value, locally and generally, the common fissure or segregated deposits, and are in some districts equally disturbed by faults. There is a distinction of importance to be drawn here, i. e. that, while in a true or cross-country vein the length of ground permitting the formation of pay chimneys is very great, in the Nova Scotia veins, the longitudinal space is comparatively limited when considered in reference to a series of rich pay ground zones. The power originally exerted at any point to permit the conditions favoring the formation of a vein, was modified at a short distance to yield similar conditions at a point more or less to one side of the plane of the first considered vein. The result, therefore, is that theoretically veins are represented as thin laminæ with ends almost overlapping. Practically, the miner in our gold districts, ignores this consideration, for while he deserts a vein as soon the quartz proves unremunerative, his next attack is directed to the nearest outcrop he finds that presents promise of profit.

Hitherto the mining industry has been almost exclusively occupied with these small veins, and the returns, although satisfactory to the individual miner, are seldom equal to the expectations of extensively capitalised companies. However, as economy in the extraction of rock and in the amalgamator's art is steadily advancing, the question of profitable mining is gradually finding its most satisfactory solution in the low grade ores. In several districts practical tests have shown that over considerable areas the slates hold gold in amounts greater than at other points. This greater richness of the slates is not accompanied by any change in the strata or its veins, beyond, perhaps, an enlargement of the beds of slate. This extra percentage of gold in the slates does not interfere with the values of the veins penetrating them, but it may, I think, be fairly stated that they hold their gold contents more evenly distributed than elsewhere, and are not marked by decidedly rich zones. The beds of quartzite are, as elsewhere, but feebly auriferous. The slates contain numerous veinlets of quartz, frequently auriferous, and the layers of the slate often contain thin laminæ of gold. The values of these slate belts vary up to five pennyweights. It may be said that gold is almost invariably present in the slates of the auriferous horizon, as frequent mill tests have shown a return up to half a pennyweight, and assays invariably show traces.

The beds of quartzite are seldom an object of interest to the miner, unless they carry quartz veinlets, which are sometimes auriferous. It has been observed that many beds carry very minute crystals of iron pyrites, forming in some cases perhaps two per cent. of the mass. Under such conditions, small amounts of gold can be detected. Assays made by me of quartzite from mining operations which did not show any metallic admixtures, yielded barely traces of gold.

If it were permitted to consider the auriferous strata lying comparatively undisturbed and traversed by true fissure or cross-country veins, and the quartz filling to have taken place, the conditions presented to the miner would have been of veins more or less enriched when passing across the alternations of quartzite and slate forming the ordinary ground, and having extensive enrichments in the spaces just referred to as forming low grade ground. Such a view of cross-country veins in the Nova Scotia gold fields is fairly in accord with the results met elsewhere, and in fact, veins of this class occasionally

met in the upper or slate division of the gold strata, which is feebly auriferous, do carry small amounts of gold over considerable distances.

From these considerations it would appear most probable that the source of the gold in the Nova Scotia gold veins should be sought in the immediate encasing strata. From the fact that the majority of worked veins present slate on one side, and quartz, etc., on the other, it would appear that the division line between strata of such differing flexibility offered the readiest plane of opening. If the questions, then, be raised which material furnishes the gold, an answer may be sought in the consideration of which would be most likely to receive and retain it.

So far as the subject has received attention, the slates appear to be the source of the gold. The metal, in common with various metallic compounds, may have been carried and deposited in the various layers as they were forming. That which fell in the sand would, presumably, for the greater part, accumulate in the underlying bed of denser material, forming the first stage in the concentration now presented. In this connection, the fact that arsenical compounds of iron are present in large amounts in the veins in several districts may be referred to as an interesting example of the local segregation of an element which is, perhaps, most abundant in rocks approximating in age those now under consideration. It is also frequently observed, that while the vein is attached to, and passes into the slate, the junction with quartzite is well-defined.

Prof. Hynd, in reporting to the provincial government on the Waverley gold district, and assuming the veins to be contemporaneous quartz beds, considers the gold of the pay zones to have been contemporaneously deposited in them as beds from some controlling cause, such as the presence of vegetable matter. It may, perhaps, be more readily understood that the gradual deposition of gold from currents in the beds of clay or mud and sand might, through special currents, be accelerated or specially increased at certain points, and that from this enriched material the veins derived their "pay streaks." The discovery of rich zones in any fissure vein is, I believe, seldom a matter of calculation beyond, laterally, the nature of the encasing strata, and vertically the shape of the fissure permitting of circulations favoring the deposition of metallic accumulations.

The points referred to in these notes have a bearing on a question of the greatest importance to the Nova Scotian gold miners, whether a pay streak in a vein is likely, after failing in depth, to be succeeded by another. Hitherto, no attempts have been made to solve the problem here, and the Government has been frequently urged to test the question by deepening some shaft worked in one of these pay streaks to a depth of, say, one thousand feet. It is assumed that by taking the line of the greater axis of the pay streak, rich ground may be found again after a barren interval, or that by a vertical sinking another underlying and distinct zone may be reached.

The plausibility of the argument may be conceded in speaking of fissure veins, but in these veins, which have, so far as mining experience has gone, very definite limits, and a limited chance of lateral enrichment, owing to their great number and proximity, its application should be cautiously received. If some of the veins have rich zones, due to lateral enrichment, the persistence of the line, however interrupted, of the underlie of the zones, would depend on the original conditions of deposition of the gold as a sediment. If it were possible to reconstruct a chart of the ocean of those days, or to assign any direction to its currents, then some foundation might be secured for applying a rule to the courses

and dimensions of the pay streaks. As yet no mining company has gone to any expense in testing the question ; the only steps in this direction are the observations that in some districts the various pay streaks have occurred along a very limited horizon of the beds, as if at that point of time, in the original deposition, the gold had been introduced more plentifully, and over an extended area, and that in other districts the best paying ground lies in blocks, not on the same line, but to the right or left of an axial line running longitudinally through the district.

VI.—*On Cretaceous Plants from Port McNeill, Vancouver Island.*

By SIR W. DAWSON, F.R.S and DR. G. M. DAWSON, F.G.S.

(Read May 25, 1888.)

I.—NOTE ON THE GEOLOGY. (*G. M. Dawson.*)

The fossil plants referred to in the following note were obtained at Port McNeill, on the north-east coast of Vancouver Island, in 1885. The precise locality is situated on the north shore of Port McNeill, bearing N. 65° E. (Mag.) from the Eel Reef. The beds here lie at an angle of about ten degrees, or not far from horizontal; and the plants are found in shales or shaly sandstones about five feet above a small seam of coal from one to two inches thick.

The Cretaceous rocks of the northern part of Vancouver Island appear to belong to a basin or deposition-area distinct from that of the Comox and Nanaimo districts to the south, and more closely connected with that of the Queen Charlotte Islands to the north. The best general section of the rocks in question, so far observed, is that in Quatsino Sound, where there seem to be represented the three higher members of the Cretaceous section of the Queen Charlotte Islands, as it exists in the vicinity of Skidegate Inlet. The cretaceous rocks which extend along the north-east coast of Vancouver Island, from Port McNeill to Beaver Harbour, may in part represent the lowest or coal-bearing portion of the Quatsino section. A few fossil plants obtained at Beaver Harbour are Middle Cretaceous, and possibly referable to a horizon near that of the lowest beds at Quatsino. The Port McNeill beds are, so far as stratigraphical evidence exists, probably much later than these; but their stratigraphical position has not been fully determined, and as no fossils but plants have been found in them, these constitute the best evidence as to their precise age at present available. (See Part B, Annual Report Geological Survey of Canada, 1886.)

II.—NOTICE OF THE PLANTS. (*Sir Wm. Dawson.*)

The plants from Port McNeill are almost entirely dicotyledonous leaves, with a few fruits. Large slabs have been procured, some with very perfect specimens of these leaves. There are no ferns or cycads in the collection, and conifers are rare. The latter are limited to fragments of a *Sequoia* of the type of *S. Langsdorffii*, branchlets of *Torreia*, apparently the species *T. densifolia* of a former paper,<sup>1</sup> and two species of *Salisburia*, or Gingko. One of these Gingkos is a beautiful little form, with leaves resembling those of the modern

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<sup>1</sup> Trans. Roy. Soc. Can., 1883, Sect. iv. p. 25.

Gingko when less than half grown in early spring. It is near to *S. integrifolia*, Heer, a Jurassic species; but also near to *S. primordialis*, Heer, from the Upper Cretaceous of Greenland. It is, however, probably new.

The exogenous leaves are very numerous, and belong to a number of genera, among which are probably *Ficus*, *Alnus*, *Betula*, *Quercus*, *Diospyros*, *Cinnamomum*, *Ceanothus*, *Populus*, *Salix*, *Proteoides*, *Juglans*, *Rhamnus*, *Aralia*, and possibly several others, evidencing a very rich and varied forest flora of warm temperate aspect.

The material is extensive, and requires so much working out, that it has not yet been fully examined; but it must include at least twenty species of exogenous trees and shrubs.

The facies of the flora, as a whole, is Upper Cretaceous, and several of the species are apparently identical with those found at Nanaimo and elsewhere in the southern basin of Vancouver Island. Others, however, are different. On the whole, the assemblage is of decidedly later type than that of Beaver Harbour, above referred to, and probably somewhat newer than that of Nanaimo, and more resembling the Upper Cretaceous plants found by Richardson at Protection Island. It is certainly more modern than the Dakota group of the United States, and the Dunvegan group of Peace River, and its nearest analogues elsewhere seem to be in the Atané and Patoot series of Greenland, as described by Heer.

The collection will, when fully worked out, add a number of interesting species to the known Cretaceous flora of British Columbia, which will be farther augmented by new species in additional collections of Dr. Dawson, made at the Wellington mine at Nanaimo.

VII.—*Observations on Early-Ripening Cereals.*

By WM. SAUNDERS, Ottawa.

(Read May 25, 1888.)

In July, 1885, there appeared in *Nature* a brief review of a paper published by W. Kowalewski, in the Memoirs of the St. Petersburg Society of Naturalists (XV. 1), in which were given the results of a careful series of observations on the periods of growth of various cereals in different parts of Russia, from the far north of Arkangelsk to the southern province of Kherson : from which it appears that in the higher latitudes the grain ripens in a shorter period than in the more southern districts, the difference in favour of the north, with spring wheat and oats, varying from twelve to thirty-five days. The intermediate regions show intermediate differences. While the author attributes these variations in the period of ripening partly to the influence of light during the long summer days in the high latitudes, he believes that the cereals in the north have undergone changes which have accommodated them to the conditions in which they are placed, or in other words, that the short seasons of quick growth have gradually induced an early-ripening habit.

Seeing that the present and prospective exports of wheat and flour are among the most important items connected with agriculture in Canada, the subject of cereals was one of the first to claim attention on the establishment of experimental farms in this country. It has been demonstrated beyond a doubt that the immense plains in the Northwest of Canada are capable of producing wheat of a very superior quality, and the area of land available for this purpose is so great that there is practically no limit to the quantity which may be grown, provided that the country be sufficiently populated and the period of growth in all parts long enough to permit of the maturing of the grain.

The early autumn frosts which have prevailed on several occasions in some parts of Manitoba and the Northwest Territories have proved very disastrous, and during the seasons of 1884 and 1885, early autumn frosts were so general and severe that the greater part of the wheat crop of the country was injured and much of it unsaleable, excepting at very low prices. Since 1885, the injury from frost has not at any time been so universal ; nevertheless some loss occurs every season from this cause, especially in the more northern settlements. The effect of this oft-repeated experience has been discouraging, and farmers everywhere are anxious to obtain early-ripening sorts which are likely to mature in time to escape this threatened danger. Knowing that the introduction of an early-maturing wheat of good quality would be a great boon to the settlers in the Canadian Northwest, correspondence, under instructions of the Minister of Agriculture, was opened without delay with parties in Northern Russia with the object of obtaining for test in this country some of the acclimatized cereals referred to by Mr. Kowalewski, which had by long

cultivation accommodated themselves to the conditions in which they were placed and acquired this early-ripening habit.

From a seed dealer in Riga, who has made a special study of the cereals grown in Northern Russia, I succeeded in obtaining in the spring of 1887 one hundred bushels of a very promising variety of spring wheat known under the name of "Ladoga" which had been grown in lat. 60° near Lake Ladoga, north of St. Petersburg. This locality is 840 miles further north than the city of Ottawa, and north of the northern boundary of Lake Athabasca, in the Peace River country. The wheat arrived late in the spring of 1887, and although promptly distributed, it did not reach the farmers in Manitoba and the Northwest Territories until from two to three weeks after the bulk of their crop had been sown. 667 sample bags of this variety, weighing three pounds each, were sent to different parts of the Dominion, a large proportion going to the Northwest. The reports received from the parties to whom it was sent for test, place the period of ripening of the Ladoga wheat from ten to fifteen days earlier than the other varieties in general cultivation. Judging from past experience, this difference of time, if maintained, would probably place this variety of wheat beyond reach of danger from early autumn frost.

The earliness of the Ladoga wheat being in some degree established, its fertility may be considered, and in this respect it makes a fair showing, as will be seen from the figures in the following table of statistics :—

RETURNS RECEIVED.	No. OF RETURNS.	YIELDS FROM 3lbs. SOWN.			TIME FROM SOWING TO HARVESTING. days.
		LARGEST. lbs.	SMALLEST. lbs.	AVERAGE. lbs.	
Manitoba.....	83	165	30	76½	102
N. W. Territories.....	68	236	21	85	105
British Columbia.....	3	112	64	85	93
Ontario.....	67	60	10	27	90
Quebec.....	15	40	6	19	85
Nova Scotia.....	15	89	20	53	102
New Brunswick.....	24	60	8	30	97
TOTAL AVERAGES.....				57	96

The season, both in Ontario and Quebec, was exceptionally hot and dry, hence the crops of all cereals were light and their ripening premature. On the Central Experimental Farm at Ottawa, a field of 14¾ acres of this wheat, sown on May 7th, was harvested in 76 days from the date of sowing, but the grain was small and shrivelled, and weighed only 57½ pounds to the bushel; the yield was 11½ bushels to the acre. Under the excep-



tional conditions named, all the varieties sown ripened prematurely, Red Fyfe and White Russian in 84 days, and White Fyfe in 83 days."

The quality of the Ladoga wheat is another very important consideration. The very high character of the Red Fyfe wheat grown in the Northwest, and the excellent quality of the flour prepared from it, has created a demand for this wheat at the highest market prices, and it is of the utmost importance to the whole country that this good reputation be maintained. The Northwest of Canada, the Northwestern United States and the Northern provinces of Russia, appear to be the only countries in the world producing those high grades of hard wheat required by the best millers everywhere to mix with the softer grain from other countries; and the introduction of any wheat of a manifestly inferior quality, which would tend to lower the standard of Canadian wheat, would be highly impolitic. The object in view in introducing the Russian wheat referred to, has been to combine, as far as possible, good quality with earliness of ripening. The original importation of Ladoga is a hard wheat with an admixture of a few softer grains. It has been submitted for opinion to a number of experts, the majority of whom place it in a grade known as "No. 1 Northern", one grade lower than "No. 1 Hard;" and estimate its value as about four or five cents per bushel less than the best Red Fyfe, but some of the samples grown from this seed have improved so much in quality and weight as to entitle them to grade with grain of the highest quality.

The influence of climate is no doubt an important factor in the production of these high grades of wheat, and the excellence of quality is believed to depend on the presence of an increased proportion of gluten, but the relative quantity of this can only be determined satisfactorily by chemical analysis. For some months past, the chemist attached to the staff of the experimental farm, Mr. F. T. Shutt, has been engaged in making such analyses and a full report of the results he has obtained will shortly be published. The work is sufficiently far advanced to enable me to say that, although the relative proportion of gluten does not in all cases correspond with the grading of the different samples by experts, the results are very interesting and show that the Ladoga wheat, in this respect, compares favorably with the best varieties. Mr. Shutt's work shows that variations occur in the proportion of gluten, in the same wheat grown in the same climate, to an extent which would lead one to infer that soil also is an important agent in bringing about these modifications. The Ladoga wheat is not so bright in colour as the Red Fyfe, but whether this will be regarded as an objection by millers can only be determined by submitting a sufficient quantity of the grain to be ground into flour.

The following samples are submitted for inspection:—

(1.) The original importation of Ladoga wheat, which weighs  $61\frac{1}{2}$  lbs. to the bushel, and is graded as about equal to "No. 1 Northern."

(2.) Sample of the same grown at Binscarth by Mr. G. L. Smellie, weighing 65 lbs. to the bushel, and graded by Mr. W. Ogilvie, of Montreal, as "Extra No. 1 Hard."

(3.) Sample of the same grown on Poor Man's Reserve, Touchwood Hills, N. W. T., by Mr. H. Keith, weighing  $64\frac{1}{2}$  lbs. to the bushel, and graded by the same expert, as "No. 1 Hard."

(4.) Sample grown at Wolseley, by Mr. Wm. Gibson, who raised the largest crop of any person in the Dominion, 236 lbs. from three pounds of seed. Mr. Ogilvie regards this

as the best result of last year's growth, and it is placed by him in the class known as "Extra Hard." This weighs 63 lbs. to the bushel.

(5.) Sample grown at Edmonton, Alberta, by Mr. Donald Ross, which weighs  $61\frac{1}{2}$  lbs. to the bushel, appears to be touched with frost, but is graded as "No. 1 Hard."

(6.) Sample grown at Mowbray, Manitoba, by Mr. A. Johnston, weighs  $64\frac{3}{4}$  lbs. to the bushel, and has been graded as "Extra No. 1 Hard."

(7.) Sample grown at Guysboro, Nova Scotia, weighing  $61\frac{1}{4}$  lbs. to the bushel, and also graded as "No. 1 Hard."

These are the best samples which have been received. Among the others are some of inferior quality, one especially, the poorest sample from Manitoba, was grown at Plum Creek, Souris, Man, which Mr. Ogilvie grades as "No. 1 Spring," the fourth grade of wheat. This weighs  $60\frac{1}{4}$  lbs. to the bushel. Whether in this case there has been some mistake in the sample of seed sent, or whether the deterioration has been brought about by some peculiarity of soil, is at present undetermined. The samples received from Ontario and Quebec, owing to the unfavorable season, were imperfectly developed and shrunken, and on this account were not submitted with the better matured specimens for test or grading.

A second importation of Ladoga wheat has been made during the present season and 1,405 sample bags distributed. As this has been sent out in good time for seeding, the results of the tests for 1888 will be looked forward to with much interest.

Among the importations of this year, the following are specially worthy of mention. Onega wheat and Onega oats from lat.  $62^{\circ}$  in Northern Russia, Petschora barley from lat.  $66^{\circ}$ , and Polar barley and Polar winter rye from lat.  $67^{\circ}$  within the Arctic circle. These are believed to be the extreme northern limits at which cereals are grown in Europe in a continental climate. All of these varieties are from the interior of Russia. In addition to a limited distribution in the present settled portions of the Northwest, 150 samples of these cereals from high latitudes have been sent for test to different points in the great Mackenzie Basin.

Early-ripening cereals are also being sought from other countries in Northern Europe, from high altitudes in the Himalayas and elsewhere, and it is hoped that by persevering efforts in this direction, varieties will eventually be obtained which will ripen sufficiently early to relieve the settler in the more frosty districts from the discouragements experienced in the past, and result in the indefinite extension of the limits of the successful cultivation of cereals in Canada, and that thus the experimental farms may become an important aid in the settlement of these distant parts of the Dominion.

VIII.—*Illustrations of the Fossil Fishes of the Devonian Rocks of Canada. Part II.*

By J. F. WHITEAVES.

(Read May 24, and revised Dec. 14, 1888.)

*Descriptions of Species from the Upper Devonian Rocks of Scaumenac Bay, P.Q. (Continued.)*

## GLYPTOLEPIS QUEBECENSIS, N. Sp.

(Plate V, fig. 4.)

Size rather small for the genus, the only complete or nearly complete specimen collected being seven inches in length; lateral outline somewhat fusiform; entire length about four times greater than the maximum height or depth; head rather short, occupying one-fourth of the entire length and apparently bluntly pointed; body moderately elongated, its dorsal and ventral margins almost straight and nearly parallel as far as the commencement of the ventrals, behind which the body narrows rather rapidly into the tail, which latter, exclusive of the fin rays, is extremely slender and much elongated.

First dorsal small, narrow, pointed and placed a little behind the midlength, as well as a little farther back than the ventrals; second dorsal nearly twice as large as the first and placed just half way between the posterior termination of the latter and the commencement of the upper lobe of the caudal; caudal fin strongly heterocercal, the rays of its lower lobe being much longer than those of the upper; pectorals acutely lobate, long, slender, pointed and reaching nearly to the commencement of the ventrals; ventrals placed at about the mid-length, their rays not extending nearly so far beyond the abdomen as those of the pectorals or anal do; anal fin large and placed very near to the commencement of the lower lobe of the caudal. Scales small, those of the central portion of the body averaging six millimetres in diameter.

One nearly entire specimen of this species was obtained by Mr. A. H. Foord in 1880 in a flattened concretionary nodule which has been split open in such a way as to expose most of the right side of the fish on one surface, and the remainder of the same side on the other. The characters of all the paired fins of one side are very well shown, but the shape and sculpture of the cranial plates cannot be satisfactorily ascertained, and the scales nowhere show the curious sculpture which is characteristic of the genus.

On account of the small size of its scales this specimen was at first referred by the writer to the *Glyptolepis microlepidotus* of Agassiz, though with some doubt, in the *Canadian Naturalist* for 1881 (Vol. X, New Series, p. 32), and subsequently, to the same section of the genus only, in the *American Naturalist* for February, 1883. As it seems impossible to decide, from the description and figure of *G. microlepidotus* in Agassiz's mono-

graph, whether the Canadian species is identical with it or not, it seems safer to give the latter a provisional name, until the true specific relations of each shall have been ascertained by a direct comparison of specimens from both sides of the Atlantic.

A second species of *Glyptolepis*, apparently of the type of *G. leptopterus*, Agassiz, appears to be indicated by two large isolated scales collected by Mr. R. W. Ells in 1880. These scales, which are nearly an inch in diameter, are ornamented with the wavy costæ and semilunar or crescentic area of backwardly directed points peculiar to the genus. It is, however, possible that they may have belonged to large and adult examples of *G. Quebecensis*, and that the specimen upon which that species is based may be a very immature individual.

EUSTHENOPTERON FOORDI, *Whiteaves*.

(Plates V, fig. 5, VI and VII.)

*Eusthenopteron Foordi*, Whiteaves, 1881. Can. Nat. and Quart. Journ. Sc., N. S., Vol. X, p. 30.

The following are the original diagnoses of this genus and species:—

“EUSTHENOPTERON,<sup>1</sup> Gen. Nov.

“*Generic Characters*.—Dermal plates of the head densely and irregularly corrugated externally, the corrugations varying in size in different parts of the same plate, but rarely or never coalescing with each other so as to form a complete network. The larger corrugations have a tendency to become tubercular. Teeth, at least the smaller ones, compressed-conical, with a sharp, cutting edge on each side. Scales of the body, cycloid, imbricating; their exposed surfaces marked either with minute, close-set, irregular, radiating, tubercular ridges,—or more rarely with a semi-circular area of concentric rows of small, distant, isolated tubercles, upon a surface ornamented with exceedingly fine, wavy, radiating lines. Dorsal fins two, separated by an interval about equal in length to the height of the body between them.<sup>2</sup> Pectoral fins unknown. Ventrals small, short, broad and placed a little behind the first dorsal. Anal fin large and broad, placed opposite to the second dorsal. Caudal fin also large and broad, heterocercal, with an unusually well developed upper lobe.

“Vertebral centres not ossified; neural and hæmal spines and interspinous bones well developed and completely ossified. Neural and hæmal spines anterior to the second dorsal and anal, and for a short distance behind them, blade-like and flattened, with more or less acute margins. Neural spines of the upper lobe of the tail simple, much elongated, subcylindrical and slightly curved. Fin rays of the lower lobe of the tail supported by nine or ten osselets, each of which is articulated by a transverse joint to one of the modified hæmal spines. On the anterior or lower side of this lobe and nearest to the anal fin,

<sup>1</sup> From εὐσθενής, stout, and πτερον, a fin, in reference to the strongly developed [bony supports of the] anal and second dorsal.

<sup>2</sup> The interval between the first and second dorsal is now known to have been about equal to one-half the height of the body between them.

the osselets are very stout and greatly elongated, but they rapidly decrease both in length and size as they approach the posterior termination of the vertebral column. The hæmal spines of the tail, like the osselets, are contracted at or about the middle and expanded at each end, but the hæmal spines are invariably much shorter than the osselets. All the fin rays, including those of the tail, are composed of a great number of rectangularly divided, short articulations. Fin rays of the second dorsal and anal fin each proceeding from three osselets of unequal size, which are articulated to short prominences, separated by corresponding concave emarginations, in the posterior half of the greatly expanded outer extremity of a broad interspinous apophysis, in the manner shewn in the accompanying woodcut.

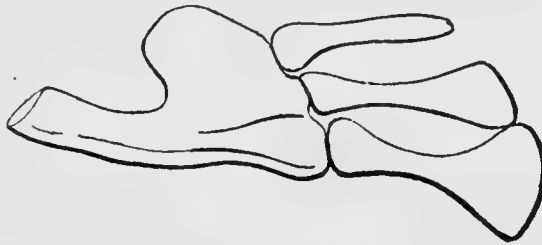


FIG. 1.—Outline of interspinous apophysis and osselets of the second dorsal fin of *Eusthenopteron Foordi*. Natural size.

“EUSTHENOPTERON FOORDI, Sp. Nov.

“*Specific Characters*.—Fish large, attaining a length of two feet or more; first dorsal fin very long, narrow and tapering to an acute point behind.<sup>1</sup>

“In the sculpture of its cranial plates, in the shape and ornamentation of its scales, and in the fact that the fin rays of its second dorsal and anal fins are both supported by three osselets articulated to a broad interspinous apophysis, this genus somewhat closely resembles the *Tristichopterus* of Sir Philip Egerton. But the vertebral centres of *Tristichopterus* are said to be ossified, and the osselets of the lower lobe of the tail are described as ‘springing from eight or nine interspinous bones,’ whereas in *Eusthenopteron* the vertebral centres are not ossified and the caudal osselets are articulated to the hæmal spines. Moreover, the bony supports of the anal and second dorsal fins are much larger and more fully developed in *Eusthenopteron* than they are in *Tristichopterus*. Thus, in *Eusthenopteron* the length of the osselets of the anal fin is equal to four-fifths of that of the apophysis to which they are attached, and the breadth of the much dilated outer end of the same apophysis is equal to rather more than one-half of its length. In *Tristichopterus*, on the other hand, the osselets of the corresponding fin are less than half the length of the apophysis from which they spring, and the slightly expanded outer extremity of the apophysis is not much more than a third of its entire length.

“The generic and specific characters of *E. Foordi* have been drawn up from a number of more or less imperfect specimens. The posterior half of the exoskeleton of the species is well seen in a specimen about one foot long, in which, however, the caudal, anal and

<sup>1</sup> The first dorsal has since been found to be smaller and neither any longer nor much more acutely pointed than the second dorsal.

second dorsal fins are imperfect. The bony supports of these fins and about five inches of the vertebral column are beautifully preserved and well exposed in another specimen. The only parts of the head found so far are fragments of the jaw, with teeth, and some isolated cranial plates, one of which is evidently the operculum.

"In associating this species with the name of its discoverer, the writer desires to acknowledge his obligation to Mr. A. H. Foord for valuable assistance in the study of the various specimens described in this paper."

The paper from which the foregoing description is quoted is dated March 31st, 1881, but in the summer of that year quite a number of additional specimens of *Eusthenopteron* were collected by Mr. Foord, which afford much new information both in regard to its external characters and interior structure.

In the *American Naturalist* for February, 1883, a brief summary of some of the new features exhibited in these specimens was published and it was there stated that the caudal fin of *Eusthenopteron* is not heterocercal, as was at first supposed, but that its rays are divided into three pointed lobes, as in *Tristichopterus*, and attention was called to its close resemblance to that genus in many other respects. No attempt, however, was then made, or has since been made, to give as detailed a description of the present genus or species as the material now in the museum of the Survey would admit, a deficiency which the present paper is intended to supply.

The most instructive specimens collected by Mr. Foord in 1881 are six in number, whose state of preservation may be thus described :—

No. 1.—This, which so far as the organism itself is concerned is the largest specimen known to the writer, is about two feet long and consists of the head and part of the body of an apparently adult individual, which, when entire, must have been upwards of three feet in length. In this specimen, the greater part of which is represented on Plate VII, the fish has been crushed nearly flat from above downwards, in a direction at nearly a right angle to the normal lateral compression. Most of the cranial buckler is well preserved, as are also the facial bones of one side of the head, though these latter are much distorted, and some are displaced in such a way as to overlap or partially overlap one another, while others have their margins much broken. The two large pectorals are well exposed in place, and parts of the first dorsal and of one of the ventrals are preserved. By removing the matrix from the under surface of the head, a considerable portion of the lower jaw and one of the large jugulars have also been exposed. In this specimen, the stout interspinous bone whose expanded outer extremity or apophysis supports the three osselets to which the fin rays of the first dorsal are articulated, exceeds an inch and a half in length.

No. 2.—This consists of a slab of stone about three feet, four inches in length and fourteen inches in its greatest breadth, one of whose surfaces is strewn with detached and isolated bones or dermal plates of the head, scales or small clusters of scales, and parts of the bony supports of the fins of a large individual. The unbroken outlines of the two large jugular plates and the exact shape of the suboperculum are well shewn in this specimen, as is also the whole of the under surface of the lower jaw.

No. 3.—A fragment shewing the under surface of most of the right side of the head of another large individual, in which several of the actual sutures can be clearly traced. The exact outlines of the right maxillary, of two of the suborbitals, of the suboperculum

and of a considerable portion of the so-called præoperculum are well exhibited in this specimen.

No. 4.—This specimen, which is represented in outline on Plate VI, is a nearly perfect example (though considerably distorted by lateral but slightly oblique compression) of a fish which measures about sixteen inches from the tip of the snout to the outer termination of the fin rays of the tail. All the unpaired fins and the paired fins of one side are well shewn in place, though the facial bones of that side of the head which happens to be exposed are not very well preserved. There are two large teeth in the lower jaw, as well as many small ones, and in this specimen the apophysis of the first dorsal is barely one inch in length, and of correspondingly slender proportions as compared with that of No. 1.

No. 5.—Another well-preserved fragment, consisting of the whole of the tail, with the tips of the anal and second dorsal, of an apparently half-grown individual, which, when entire, was probably of about the same size as No. 4. This fragment is of special interest as shewing the narrow and acute prolongation of the scaly portion of the body far up into the central lobe of the tail, a character which is not seen at all in most of the other specimens and only very indistinctly in No. 4.

No. 6.—In this specimen, an outline of which is given on Plate V, fig. 5, the greatest length of the fish is seven inches. The general contour of the whole of the body, as well as the exact shape and relative position of all the unpaired fins and of the paired fins of one side, are remarkably well shewn, but the head is not at all well preserved.

GENERAL SHAPE AND PROPORTIONS.—These, as already remarked, are best shewn in specimen No. 6, which, however, is obviously very immature. At this stage of growth the lateral outline is narrowly subfusiform, the head is obtusely pointed and occupies a little less than one-fourth of the entire length, the body is slender, its dorsal and ventral margins being nearly straight and parallel from immediately behind the head to the commencement of the first dorsal and ventrals, after which there is a gradual but irregular narrowing of both these margins towards and into the tail. The maximum length is more than four times, but less than five times, the greatest height. The first dorsal is triangular in outline and placed a little behind the midlength, as well as almost immediately opposite the ventrals. The second dorsal is longer and more acutely pointed than the first, the former being situated a little in advance of the anal and much nearer to the upper lobe of the caudal than to the basal termination of the first dorsal. The fin rays of the tail are divided into three distinct lobes, the two outer ones being slightly convex on their outer margins and faintly concave on their inner, the extremities of both being rather acutely pointed. The central lobe is rather more obtusely pointed than the two lateral lobes, and both of its lateral margins are slightly convex. The central lobe, also, is almost exactly equidistant from the upper and lower lobes of the tail, and not placed much nearer the upper lobe, as in Dr. Traquair's restoration of *Tristichopterus*. The anal fin, which is placed close to the lower lobe of the tail, is of very nearly the same shape as the second dorsal, though not quite so large, and the ventrals are similar in size and shape to the first dorsal. The pectorals, at least at the stage of growth indicated by No. 6, are slender and longer than the ventrals and first dorsal, as well as apparently rounded at their apices.

The only other specimen which gives any information as to the general shape and proportions of the species is No. 4. In this, as in another example of about the same dimensions in the Redpath Museum at Montreal, though the dorsal outline is nearly straight, the contour of the abdomen seems to have been proportionately deeper and more convex than it was at an earlier stage of growth, and with age the pectorals seem to become much broader relatively and more robust.

Owing partly to the large size that the species attains to and partly to the circumstance that specimens are most frequently met with in concretionary nodules, it unfortunately happens that the adult fish is so far represented in the Survey and other collections accessible to the writer, either by mere fragments or at best by specimens that are too imperfect to give even an approximately correct idea of the general form at this stage of growth.

**THE HEAD.**—In the number, shape and relative disposition of the dermal plates which constitute the external armature of the head, there is a very close resemblance between *Eusthenopteron* and the published restorations of *Tristichopterus* and *Osteolepis*. Before attempting to describe those of *Eusthenopteron*, however, it may be well to premise that most of the specimens of *E. Foordi* that the writer has seen, are so much distorted or abnormally compressed, in almost every direction, as to cause the same plate to assume somewhat different shapes in different individuals. Owing partly to this distortion, which often causes the edges of the cranial or facial plates to project, and partly to their brittleness, it is almost impossible to avoid breaking the margins of these plates while hammering or splitting specimens out of the rock, and it is, accordingly, seldom that any of the former are found entire.

The cranial buckler was well developed in adult examples of *Eusthenopteron*, but there is only one specimen (No. 1) in the Survey collection in which its characters are at all well shewn, and a considerable portion of its margin is broken, though the surface ornamentation is beautifully preserved. In this specimen the cranial buckler is divided by a transverse suture into two plates of unequal size and dissimilar shape, the one an anterior, frontal or fronto-ethmoidal portion, which it will be convenient to designate as the frontal plate, and the other a posterior portion, which may be called the parietal plate. The frontal plate is both longer and narrower than the parietal.

The anterior or premaxillary region of the frontal plate forms a more or less obtusely pointed snout, whose under-margin is fringed with an outer row of recurved conical teeth, two of which are of comparatively large size and the rest uniformly smaller. In specimen No. 1, the exposed portions of the larger of these outer premaxillary teeth are nearly four millimetres in length, while those of the smaller ones average about two. A specimen not specially enumerated, which gives a good profile view of the anterior termination of the head shews that the extreme tip of the upper jaw is somewhat recurved and that it slightly overlapped the apex of the lower jaw. Immediately behind the snout the frontal plate narrows rather abruptly inward, after which its lateral margins are concavely excavated on both sides and ultimately both become gently convex. The posterior margin of the frontal plate is nearly straight but slightly emarginate in the centre. In addition to the ordinary surface markings of the cranial buckler, as described in the original diagnosis of the genus, from the base of the frontal plate an



obscure impressed line or narrow groove extends along the median line to about the midlength, where it bifurcates, after which each branch curves outward and forward for a short distance, then slightly inward, until both become too indistinct to be traced any farther.

The parietal plate is doubly flexuous, or doubly and faintly convex with a shallow sinus between each convexity, on each of its lateral margins, and widens rapidly backward into a broadly truncated but slightly sinuous base, whose breadth is much greater than the length of the plate as measured along the median line.

Immediately behind the cranial buckler there are three small plates, which evidently correspond to the supratemporals in Dr. Traquair's diagrammatic representation of *Tristichopterus* and to the occipitals of *Osteolepis* as restored by Pander. Unfortunately, these plates are preserved only in a single specimen of *Eusthenopteron* (No. 4), and in it they are displaced in such a way as to partially overlap one another and so much broken at the edges that their exact shape cannot be ascertained.

The orbit is placed very far forward, and in one specimen (No. 4), on and partly around the upper margin of the left eye, there are indications of what seem to have been five rectangular, or somewhat wedge-shaped and closely contiguous, thin, radiating plates, which are higher than broad. These plates are probably homologous with the circumorbitals of Traquair's restoration of *Dapedius*, as well as suggestive, in a general way, of the still more highly specialized sclerotic plates in the eye of *Ichthyosaurus* and *Megalosaurus*. In this connection it may be well to mention that in a head of *Phaneropteron curtum*, collected by Mr. Foord in 1881, the space originally occupied by the pupil of the left eye is completely surrounded by a circle of similar impressions, a circumstance which seems to shew that in this species there was a continuous series or ring of circumorbitals. This specimen, which was overlooked when the description of *P. curtum* in the first part of the present paper was written, will be found described more in detail on pages 91, 92, and figured on Plate X.

In *Eusthenopteron*, as in *Osteolepis* and *Tristichopterus*, there appear to have been three suborbital plates around each eye, but only two of these are distinctly shewn in the specimens of *E. Foordi* in the Survey collection.

The exact shape of the inferior suborbital is clearly defined in specimen No. 3, and in another fragment not specially enumerated, while its relative position is well exhibited in specimens Nos. 1 and 4. In the former it appears as a narrowly elongated plate, whose maximum length is more than three times its greatest height or breadth. It is clearly the largest of the three suborbitals and extends as far forwards beyond the orbit as to the anterior termination of the maxilla, and beyond the orbit behind, to about two-thirds of the entire length of the maxilla. Its upper margin is concavely excavated a little in advance of the midlength, apparently to form part of the orbit; its lower margin is long, straight and suturally connected with the upper margin of the maxilla; while its narrow anterior and somewhat broader posterior extremities are both obliquely subtruncated and widen outward.

The posterior suborbital, whose shape and position are best seen in specimens Nos. 1, 3 and 4, is also longer than broad, and its front margin would seem to have been more or less truncated or excavated to form part of the orbit, though this part of the plate is unfortunately either imperfect or crushed out of shape in the very few specimens in

which it happens to be preserved. The upper margin of the posterior suborbital is angular in the middle (immediately opposite the transverse suture which divides the frontal from the parietal plate) and subangular at both ends, while at each side of the central angle the margin is shallowly concave. Its lower margin is nearly straight in front and rounds up obliquely behind.

The precise contour and exact location of the third suborbital are not satisfactorily shewn in any of the specimens of *E. Foordi* collected by Mr. Foord. In specimen No. 1, a longitudinal but slightly concave suture appears to cut off a small plate, which may represent the third suborbital, from the anterior portion of the lateral margin of the frontal plate, but this supposed suture may be only one of the superficial surface markings, or even a mere accidental crack in the frontal plate. Immediately above the space originally occupied by the eye, in specimen No. 4, there is a small narrow plate, which also may represent the third suborbital, but the exact shape of this plate is not well shewn, and it may have been misplaced.

The maxilla is long, narrow and pointed at both ends. Its lower or tooth-bearing margin is nearly straight, and its upper margin is slightly expanded a little behind the midlength. It is bounded in front by the posterior termination of the premaxillary portion of the frontal plate, and above, partly by the entire lower margin of the inferior suborbital, and partly by the anterior half of the lower margin of the præoperculum, which is shallowly and somewhat obliquely excavated for its reception.

The so-called præoperculum (the supratemporal of Huxley) is a large plate which covers most of the cheek. It is rather irregular in shape, but may be described in a general way as a somewhat five-sided plate, which is longer than broad, as well as pointed near the middle in front and at the base behind. Its front margin is acutely pointed a little below the middle, where it fits into the angle formed by the infero-posterior margin of the posterior suborbital with the posterior margin of the inferior suborbital; its lower margin is nearly straight behind the centre, where it forms a continuous line with the lower margin of the maxilla, and shallowly excavated in advance of the middle, as already stated, for the reception of the posterior end of the upper portion of the maxilla. The upper margin of the præoperculum is bounded by and suturally connected with the posterior half of the lateral margin of the parietal plate; and the posterior margin of the former, which is obliquely subtruncated but somewhat flexuous, is bounded by the anterior margins of the operculum and suboperculum.

The operculum is considerably higher than long, and its anterior margin is shallowly concave. Its upper margin is somewhat narrowly rounded, its posterior border is obliquely convex, and its lower margin is convex in front and concave behind.

The suboperculum, which is placed immediately below the operculum, with which it is suturally connected, is a little longer than high, and its anterior margin is also shallowly concave. Its posterior and lower margins unite to form one broadly convex and nearly semicircular curve, and its upper border is concave in front and convex behind. In their natural position these two plates are so closely united as to look almost like one large and bean-shaped plate, and in every respect are closely similar to the corresponding plates in the recent *Lepidosteus osseus*.

In most of the specimens of *Eusthenopteron* in the Survey collection, such as Nos. 1, 3, 6, and a few others not specially enumerated, the lower jaw is seen in profile only, and

from this point of view the mandibular rami are elongated, comparatively narrow and more or less pointed at both ends. As viewed laterally, their upper and tooth-bearing margins are nearly straight, their lower borders gently convex, and are deepest or broadest near the midlength. The anterior termination of both jaws is well seen, but in profile also, in a specimen to which reference has been made on page 82. In this specimen the lower jaw curves obliquely upwards at its anterior termination, and is slightly overlapped by the somewhat recurved apex of the upper jaw, which latter projects a little beyond the lower jaw in front. Posteriorly, and in a profile view, each of the mandibular rami extends just as far backward as to the postero-inferior termination of the præoperculum. In specimen No. 2 the lower jaw is displaced, isolated and crushed down in such a way as to shew the whole of the under and a considerable portion of the infero-lateral surfaces of both of the rami of which it is composed. As seen in this specimen, the two mandibular rami are very stout, and diverge outward and backward in a gentle curve from the symphysis. They widen gradually backward and forward, and at their rather broad posterior terminations, are rather deeply and subangularly notched near the centre, apparently for articulation with the quadrate, and divided thereby into two processes, of which the inner one, which probably represents the condyloid process, is longer, broader and more rounded posteriorly than the outer one. Although the dentary, articular and angular elements are evidently well developed in each ramus of the lower jaw of *Eusthenopteron*, the exact limits of these elements cannot be defined in any specimen known to the writer, and no trace of the splenial has yet been detected. In a full side view, the lower jaw of *Eusthenopteron*, with its teeth, is singularly like that of the *Asterolepis* of Hugh Miller (but not of Eichwald), as figured in the "Footprints of the Creator," but as seen from below, the same jaw bears an equally close resemblance to that of *Dipterus* as illustrated by Hugh Miller in the same volume.

On the under surface of the head, the space between the mandibular rami is filled by two long and rather slender jugular plates, which are very acutely pointed in front and narrowly rounded behind. In *Eusthenopteron*, as in *Tristichopterus*, no traces can be detected of an azygos jugular plate, or of any small lateral plates.

DENTITION.—The outer row of teeth upon the premaxillary portion of the frontal plate has already been partially described in connection with that plate. The two maxillæ of the upper jaw and the presumably dentary region of each of the mandibular rami of the lower, are each armed with an outer row of very small and closely arranged, but not quite equidistant teeth, and with an inner row of much larger ones, which are placed at comparatively wide intervals apart. The small outer teeth are conical, and slightly curved. To the naked eye they appear perfectly smooth, but under a powerful simple lens they are seen to be faintly and longitudinally striated. The large inner teeth are also conical in form, but strongly compressed, and they are also longitudinally grooved. In specimen No. 4, which, however, is obviously not more than half grown, there are two comparatively large teeth, about six millimetres in height, besides many much smaller ones, on the right ramus of the lower jaw. The first of these large teeth is placed at a distance of about thirteen millimetres from the anterior termination of the ramus, and the second about fifteen millimetres from the first, but in this particular specimen some of the larger and inner teeth have evidently been displaced and are lying

isolated in various positions in the space between the slightly open jaws. A detached left ramus of the lower jaw of a somewhat larger individual shews that there is one large inner tooth, about thirteen millimetres in height, at the anterior termination of the ramus close to the symphysis, and another specimen shews that the posterior termination of the premaxillary region of the right side of the frontal plate was also armed with a large inner tooth. A fragment of a lower jaw, about three and a half inches in length, which apparently represents part of the dentary bone of a large individual of *E. Foordi*, shews two large inner conical teeth, of unusual size, besides several small ones. These two large teeth are unfortunately broken, but the larger one must have been nearly eighteen millimetres high. Both are strongly grooved in a longitudinal direction, and their lateral margins are thin and sharp. The specimens in the Survey collection do not shew, conclusively, whether there were any palatal teeth in *Eusthenopteron* or not.

THE SHOULDER-GIRDLE AND PAIRED FINS.—The mode of attachment of the upper part of the shoulder-girdle to the skull in *Eusthenopteron* is not clearly exhibited in any of the specimens which the writer has seen, nor have any of the internal constituents of the shoulder-girdle been recognised with much certainty. In specimen No. 2, however, a rather slender and slightly curved bone, which is partially detached from the immediately adjacent clavicle which apparently once overlaid it, may possibly represent its ossified coraco-scapular element. This bone is narrow at what would seem to have been its upper termination, and widens gradually and is moderately expanded below. The only specimen, in which any considerable portion of the membranous external elements of the shoulder-girdle is preserved in nearly their natural position, is No. 4, but in it the outlines and relative position of the supraclaviculars, and of the interclavicular of one side can be traced, though not without some difficulty. Immediately above the clavicle, with whose upper margin it is suturally connected, there is a narrowly elongated dermal plate, which is probably one of the supraclaviculars. This plate, which is pointed in front and widens moderately backward, extends obliquely upward and forward, beyond the clavicle. The clavicle itself is a rather narrow plate which is elongated in a direction at nearly a right angle to the longitudinal axis of the body. The upper margin is rather narrowly rounded, and its lower border appears to have been acutely produced in front. Its anterior border, which is partly overlapped by the suboperculum, is seen to be straight in another specimen (No. 2), and its posterior border appears to have been shallowly concave. In the abdominal region, both clavicles are bent abruptly inward, and those portions of the clavicle which are overlapped by the opercula and subopercula are ornamented with a slightly different sculpture to those which are not. In front of the lower margin of each clavicle there is a small plate, which is probably one of the interclaviculars. This plate is much longer than high, its anterior margin is obliquely truncated and acutely pointed below, and its posterior extremity is narrowly rounded. The posterior half of its upper margin is overlapped by the antero-inferior margin of the suboperculum, and its lower border is nearly straight in front and curved slightly and convexly upward behind.

The pectorals are preserved only in specimens Nos. 1, 4, and 6, and the ventrals only in Nos. 4 and 5. In each of these specimens the paired fins that are visible have been

split longitudinally, so that although their marginal outlines and internal structure are for the most part well exhibited, both sides of the outer or tegumentary surface of each of these fins is buried in the matrix. In consequence of the peculiar way in which these fins happen to be exposed in the few specimens in which they are preserved at all, it happens that no external lobation of either the pectorals or ventrals is actually visible in any of the specimens of *Eusthenopteron* in the Survey collection, but it by no means follows that these fins were not lobate. The paired fins of *Tristichopterus* are known to have been lobate, and, as will presently be shewn, there is such a close resemblance in internal structure between the pectorals and ventrals of that genus and those of *Eusthenopteron*, that it is most likely that those of *E. Foordi* were lobate also. The marginal outlines of both pectorals in the adult fish are well seen in specimen No. 1. In all stages of growth the pectorals are a little larger than the ventrals, but in the adult condition, as exemplified by specimen No. 1, the marginal outline of the former is obovately subtriangular.

The bony supports of the fin-rays of the pectoral are well exhibited in specimen No. 4. In this specimen, immediately behind the clavicle, there is some obscure, bony matter, but it is impossible to decide whether this consists of the expanded end of one comparatively large bone, such as the base of the coraco-scapular ossification, or of two wholly or partially separated small bones. From the posterior termination of this bony matter there proceed two small, short and separate bones, which may be designated respectively as Nos. 1 and 4, as No. 1 is the first of an upper series of three bones which it will be convenient to enumerate as Nos. 1, 2, and 3, and No. 4 the first of a lower series of three, which will here be referred to as Nos. 4, 5, and 6, the whole being thus numbered on Plate VI. The first bone of the upper series (No. 1), and the first of the lower (No. 4), are both concavely constricted in the middle, but the former is much broader and shorter than the latter. To the truncated, somewhat expanded and slightly bifurcated posterior extremity of the first of these upper bones (No. 1), there are articulated two bones (Nos. 1 and 4), and, finally, to the posterior termination of the second bone of the upper series (No. 2), there are articulated two other bones (Nos. 3 and 6), which, in their turn, bear a very close resemblance to Nos. 2 and 5. In this particular specimen, therefore, there are six ossified segments of the archypterygium preserved, in addition to the obscure bony matter next to the clavicle. Of these, the three that are uppermost (Nos. 1, 2 and 3) are almost exactly alike, and are squarely truncated at both ends. In Nos. 1 and 2, however, there are articulating surfaces at both ends, whereas in No. 4, from which only the ordinary fin-rays appear to proceed, there is no well defined articulating surface posteriorly. The three lower segments (Nos. 4, 5 and 6) appear to be precisely similar in shape and are each truncated in front and narrowly rounded behind. From their relative position it might be assumed that these three upper segments represent the radials and the three lower ones the basals, but judging by their shape and from analogies with the internal structure of the pectoral in *Ceratodus*, it seems more probable that the three upper segments of the anterior portion of the corresponding fin in this specimen of *Eusthenopteron*, may represent the axial or medial elements of the fin, and the lower segments the radial element. However this may be, the fin-rays which spring directly from these six bony segments are long, slender and closely arranged. At their commencement on each side of the fin the rays are short, but they rapidly

lengthen and increase in number by bifurcation and division, so that, at the posterior termination of the fin, they are about five times as numerous as at its anterior end. Each fin-ray, also, is divided through its entire length by transverse articulations into rectangular joints, which are about twice as long as broad, at least in the anterior half of the fin. In the largest specimen of *Eusthenopteron* known to the writer (No. 1), the maximum length of one of the pectorals is eighty-five millimetres, and the greatest breadth approximately sixty-eight. In this specimen the longest fin-rays are about one millimetre and a half broad at the commencement, and at their termination posteriorly they average from one-fourth to one-fifth of a millimetre in breadth. At and near their commencement, also, they are divided into joints which average three millimetres in length, but at their posterior termination the length of the joints averages from one-half a millimetre to a whole one.

The structure of the ventrals in *Eusthenopteron* appears to be essentially similar to that of the pectorals. The only specimen in which any of the bony supports of the fin-rays of the ventral fin are preserved is No. 4 and even in it only two of these bones, which appear to correspond with the last of the upper series (No. 3) and the last of the lower (No. 6) in the pectoral, are visible. Of these, the upper one, which is truncated at both ends, is broader and shorter than the lower one, and both are very similar in shape to the corresponding bones in the pectoral. The pelvic bones are not preserved in any of the specimens of *Eusthenopteron* that the writer has seen. The rays of all the fins, including those of the tail, appear to have been constructed on the same plan.

THE AZYGOS FINS.—The external form and relative positions of these fins have already been described and their component rays apparently present no special peculiarities. The bony supports of the first dorsal are still unknown, at least to the present writer, and those of the second dorsal and anal fins are best shewn in one of the original types, in which a considerable portion of the posterior end of the endoskeleton, with its lateral appendages, is beautifully preserved and upon which the genus was largely based. In this specimen, it should be premised, the bony supports of the second dorsal, as a whole, are slightly displaced, but their relative positions are unaltered. The three osselets from which the fin-rays of the second dorsal spring, although slightly unequal in breadth at their flattened and rather broadly expanded outer extremities, are nearly equal in length. The still more broadly expanded and laterally compressed apophysis to the upper and posterior margin of which these osselets are articulated, forms in its turn the outer half of a much larger and probably interspinous bone which narrows very abruptly a little below its midlength, especially anteriorly, and is obliquely truncated at its inner termination, which is very slightly expanded. It seems highly probable that this bone was originally articulated to one of the modified neurapophyses of this part of the vertebral column, for the neural spine which immediately precedes it (unlike any of those by which it is itself preceded, which are acutely pointed above) is obliquely truncated at its slightly expanded upper and outer extremity, as if to form an articulating surface of attachment. The three osselets from which the fin-rays of the anal spring are similar in shape to the corresponding bones in the second dorsal, but the anterior seems to have been a little the shortest of the three. The apophysis to the outer margin of which these osselets are articulated, is also very similar in shape to that of the

second dorsal, and like it, forms part of a comparatively large and probably interspinous bone, which narrows abruptly inwards at about the midlength, especially in front, but which seems to be directly attached, by a transverse articulation, to the outer and slightly expanded end of one of the modified hæmal spines.

THE INTERNAL SKELETON OF THE TRUNK.—Very little if any additional information on this point is afforded by the specimens collected by Mr. Foord since the original description of the genus was written. The statement therein made, that the vertebral centres of *Eusthenopteron* are not ossified, appears to be fully corroborated by the new material obtained. In specimen No. 4 and others, as well as in one of the original types, the neural and hæmal spines of the posterior half of the vertebral column are beautifully preserved in place, but in none of them can a trace be detected of the vertebral centres of which they must originally have formed parts. Not a vestige of a rib or of any other part of the anterior half of the endoskeleton can be observed in any of the specimens in the Survey collection. With the exception of those to which the interspinous bones of the azygos fins and tail are articulated, the neural and hæmal spines of the posterior half of the vertebral column, are slightly curved, and diverge obliquely backward and outward. Their inner extremities are slightly expanded and each spine narrows outward into an acute point. In the upper lobe of the tail, the fin-rays spring from the outer terminations of the neural spines, but those of the central lobe seem to have originally abutted directly on the vertebral axis. The nine or ten "osselets" from which the fin-rays of the lower lobe of the tail spring, and whose truncated inner ends are articulated to as many modified hæmal spines, are doubtless true interspinous bones, which are not essentially different in their nature from the corresponding bones in the tail of *Tristichopterus*, as they were first supposed to be.

SUPPOSED AFFINITIES OF THE GENUS.—From the foregoing description it will be seen that there are so many points of resemblance between *Eusthenopteron* and *Tristichopterus* that it may possibly be doubted whether the distinction between the two genera can be maintained. The principal differences between them, as they now appear to the writer, may be thus briefly summarized.

(1). So far as can be ascertained at present, the vertebral centres of *Eusthenopteron* do not appear to have been ossified at all, and they are therefore presumed to have been originally notochordal or cartilaginous in their structure, as is known to have been the case with many other ganoids of the Devonian rocks. In *Tristichopterus*, on the other hand, the vertebral centres are stated to be completely ossified and in this respect the genus is said by its author to stand "alone among the contemporaneous fishes."

(2). In *Eusthenopteron* the interspinous bones to which are attached the three osselets from which the component rays of the second dorsal and anal spring, appear to have been articulated, the one to one of the modified neural and the other to one of the modified hæmal spines. The corresponding bones in *Tristichopterus* are represented as spinous rather than interspinous in their character and as each abutting directly on the vertebral axis. Moreover, in *Eusthenopteron*, as originally pointed out, the outer extremity or apophysis of the interspinous bone in each of these fins is much more broadly expanded than the apophyses of the corresponding bones of *Tristichopterus* are represented to be in Sir Philip Egerton's figures of the types of that genus.



(3). The posterior margin of the tail in *Eusthenopteron*, as in that of *Tristichopterus*, is divided into three distinct lobes, but in the former genus the median lobe of the tail is almost exactly equidistant from the upper and lower lobes, and not placed much nearer the upper lobe, as it is in *Tristichopterus*.

(4). The larger teeth of *Eusthenopteron*, or, at any rate their upper halves, appear to be strongly compressed and their lateral margins are thin and sharp, whereas those of *Tristichopterus* are said to be circular in transverse section.

Whether these differences, with some others of minor importance that could be pointed out, are of generic or of only specific importance, remains yet to be ascertained.

#### CHEIROLEPIS CANADENSIS, *Whiteaves*.

(Plate VIII.)

*Cheirolepis Canadensis*, Whiteaves, 1881. Can. Nat. and Quart. Journ. Sc., N. S., Vol. X, p. 33.

The following is an amended description of this species.

Maximum length of the largest specimen collected twenty-one inches, greatest height about one-fifth of the entire length; general outline elongate-fusiform. Length of the head a little greater than the maximum height of the body; cranial plates exquisitely sculptured with delicate, irregular corrugations, which are crossed obliquely by ribs which are so minute as to be quite invisible to the naked eye. In some of the cranial plates the corrugations consist of wavy ridges of varying length, separated by corresponding but much wider grooves. Occasionally the ridges appear to be made up of a series of confluent tubercles. In other plates the corrugations or ridges anastomose so as to form a dense but irregular network. Margin of orbital cavity circular. Teeth conical, slender, of unequal size. Scales of the body, minute, ganoid, rhomboidal or sub-rhomboidal, about one-third of a line long, and sculptured with acute ribs which radiate longitudinally from the posterior angle of each scale. Scales of the fins and tail nearly rectangular and acutely ribbed at their edges. In the central portions of the fins and tail the scales are twice as long as broad, but near the outer margins of the fins they become much narrower and more elongated. Dorsal fin single, triangular and placed very far backward; the base of its posterior ray nearly but not quite extending to the commencement of the upper lobe of the tail. Tail heterocercal, its upper lobe fringed by a row of backwardly directed, flattened spines or "fulcral scales," which diminish in length towards the posterior termination of the lobe. Ventral fins situated considerably in advance of the midlength and separated from the pectorals by a short interval. Anal fin placed much farther forward than the dorsal, and separated from the ventrals by a space slightly exceeding in length the height of the body at the commencement of the anal.

The above name was suggested provisionally for a species of *Cheirolepis*, which resembles the *C. macrocephalus*<sup>1</sup> of McCoy and the *C. Cummingiæ* of Agassiz in the shape and sculpture of the scales of its body and fins. The ventral fins of *C. macrocephalus*,

<sup>1</sup> *C. macrocephalus*, McCoy, has been shown by Sir P. Egerton to be synonymous with *C. Trailliæ*, Agassiz.



however, are described by McCoy as "nearly central, of moderate size, half their length distant from the anal," whereas the ventrals of *C. Canadensis* are placed much farther forward and are separated from the anal by a much larger space. The ventrals of *C. macrocephalus*, too, are represented by McCoy as being rather nearer to the anal than they are to the pectorals, but those of *C. Canadensis* are very much nearer to the pectorals than they are to the anal. In *C. Cummingiæ*, according to Hugh Miller, "the large pectorals almost encroach on the ventrals, and the ventrals on the anal fin," but this, as already stated, is by no means the case with *C. Canadensis*. The dorsal fin of *C. Canadensis*, also, is placed much farther backward than is that of *C. Cummingiæ*, and the anal farther forward.

Of this species, four well preserved specimens, two of which are nearly perfect, were collected by Mr. Foord in 1880, and one of unusually large size in 1881.

*Additional Notes on the Species from Scaumenac Bay.*

BOTHRIOLEPIS CANADENSIS.

*Pterichthys (Bothriolepis) Canadensis*, Whiteaves, 1860. Am. Journ. Sc. and Arts, Third Ser., Vol. XXI, p. 132. *Ib.*, Trans. Royal Soc. Can., 1886, Vol. IV, Sec. IV, p. 101, Pls. VI-IX.

When the first part of the present communication was written, the writer unfortunately had not access to Lahusen's paper on the genus *Bothriolepis* (Trans. Imp. Min. Soc. St. Petersburg, 1879) nor to Trautschold's on *Bothriolepis Panderi* (Bull. Soc. Imp. Nat. Moscou, Vol. IV, pt. 2, 1880.) As it has been clearly shewn by both of these writers, by Zittel & Cope and still more recently by Dr. Traquair, that *Bothriolepis*, Eichwald, is quite distinct from *Pterichthys*, Agassiz, the Canadian species must be definitely referred to the former genus.

ACANTHODES AFFINIS, N. Sp.

(Plate V, figs. 1 and 1a-f.)

*Acanthodes Mitchelli* (?) Egerton. Whiteaves, 1887. Trans. Royal Soc. Can., Vol. IV, Sect. IV, p. 107.

As there is some reason for supposing that this interesting little fish is distinct from the *A. Mitchelli* of the Devonian rocks of Scotland, it is thought desirable to retain for the former the name suggested for it in the fourth volume of the Transactions of this Society, in which a detailed description of the species will be found.

PHANEROPLEURON CURTUM.

(Plates V, fig. 3, and X, fig. 1.)

A fragment collected by Mr. Foord in 1881, in which only a part of the head is preserved, and which has already been referred to on page 83, gives some additional infor-

mation in regard to this species. The eye, in this specimen, is placed very far forward and it seems to have been surrounded by a complete circle of about twenty-six small circumorbital plates. These plates are rectangular in outline, a little longer than broad and are all of exactly the same length. There were probably also three circumorbital plates in *P. curtum*, though only the inferior and the posterior suborbitals are preserved in the specimen now under consideration. In their shape and relative position, these two suborbitals, as well as the large præoperculum which lies immediately behind them, are exactly similar to the corresponding plates of *Eusthenopteron*.

The maxillæ are very slender in front and slightly expanded at their upper margins behind. Their lower and tooth-bearing margins are nearly straight, and their upper margins are shallowly concave in front and gently convex behind. The two jugular plates are much longer than broad. They widen gradually backward and are acutely pointed in front and narrowly rounded behind.

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*Descriptions of Species from the Lower Devonian Rocks at Campbellton, N. B.*

CEPHALASPIS CAMPBELLTONENSIS, *Whiteaves*.

(Plate X, fig. 2.)

*Cephalaspis Campbelltonensis*, Whiteaves, 1881. Can. Nat. and Quart. Jour. Sc., N. S., Vol X, p. 98.

Head shield (the only part known) large, somewhat pointed in front, obliquely rounded at the sides anteriorly and produced behind into moderately elongated, slightly incurved cornua. Maximum breadth about seven inches. Orbits varying in outline from nearly circular to longitudinally broad ovate, subcentral, approximated, and placed at distances from each other varying in different specimens from once to thrice the diameter of the orbit itself. Antorbital prominences rounded-conical; interorbital prominence also conical but somewhat elongated longitudinally; postorbital valley bounded by two narrow raised ridges, each of which starts from a prominence immediately behind the orbit; about half way between the orbits and the posterior margin these ridges coalesce, so as to form a single, broad and prominent but somewhat obscurely defined, posterior ridge.

Outer surface, which is very rarely preserved, polished and almost smooth to the naked eye. When examined under a lens it is seen to be minutely and densely pitted, the pits being very irregular in their shape, size and method of arrangement. Where the enamel is removed the surface is divided into numerous well marked polygonal areas.

Large specimens of the head-shield of this species are abundant in the Campbellton breccia, but the most perfect ones yet obtained do not show the outline of the whole of the posterior margin of the shield very clearly, the contour of that part of the head being slightly restored in the figure on Plate X. The orbits and the prominences and depressions in the central portion of the shield are often well defined, but the specimens are always crushed and nearly always exfoliated. Portions of the true outer layer of the test have been seen only on the central portion of the outer margin of the sides of one large fragment and on the extremities of the cornua in two or three other specimens.

The genus *Cephalaspis* has been divided by E. Ray Lankester into three subgenera, viz., *Eucephalaspis*, *Hemicyclaspis* and *Zenaspis*, but as *Hemicyclaspis* is stated to be devoid of cornua it is clear that the *C. Cambelltonensis* cannot belong to this subgenus. Of the two which remain, *Eucephalaspis* and *Zenaspis* have precisely similar head-shields, but the body of *Zenaspis* has a dorsal scute placed immediately behind the posterior spine. In the absence of any knowledge of the body of the Campbellton species, therefore, it is uncertain to which of these two subgenera it should be referred.

Including the *C. Dawsoni* of Lankester, from Gaspé, all the specimens of *Cephalaspis* hitherto described, are said to be characterized by a surface ornamented by raised tubercles, so that the *C. Cambelltonensis* may be readily distinguished by its minutely pitted sculpture. In general outline, the head-shield of the present species appears to be very much like that of the *Eucephalaspis Powriei* from the Old Red Sandstone of Forfarshire.

*Coccosteus Acadicus*, *Whiteaves*.

(Plate IX.)

*Coccosteus Acadicus*, Whiteaves, 1881. Can. Nat. and Quart. Journ. Sc., N. S., Vol. X, p. 94.

*Cranial-shield* (Woodcut and Plate IX, fig. 1.)—Flattened or depressed centrally and a little in advance of the centre, but always rising into a broad, low prominence on the median line at a short distance from the posterior margin; sides somewhat sloping. General outline that of an ovoid truncated at its broadest extremity, the truncation being posterior, the length and breadth nearly equal, and the greatest breadth behind the mid-length. Postero-lateral angles (*a.a.*) somewhat produced; lateral margins most convex

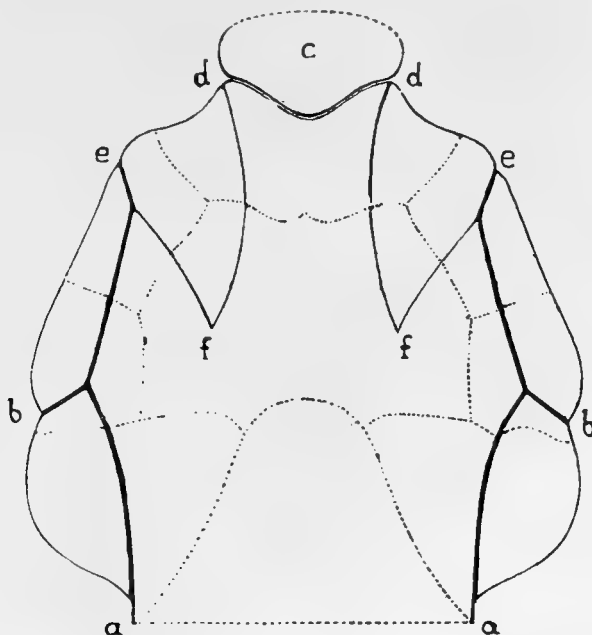


FIG. 2.—Outline of a specimen of the cranial shield of *C. Acadicus*, shewing the rostral plate (*c*) in situ. Some of the superficial grooves restored from other specimens. Natural size.

posteriorly, slightly concave anteriorly, and with a small, but distinct notch (*b*) a little behind the middle. When the rostral plate (*c*) is absent, which is almost invariably the case, the anterior margin is concavely emarginate in the centre, the emargination being broad, transverse and bounded on each side by an obtusely triangular projection (*d*). On the outer side of each of these projections there is an obliquely and shallowly concave, lateral emargination. In one specimen only (that from which the woodcut and fig. 1 on Plate IX were made) the rostral plate (*c*) fits into and completely fills up the central emargination of the front margin of the shield. This plate, which is nearly twice as broad as long, projects beyond the front margin of the shield, its two sides are narrowly rounded, but its anterior margin is broken. Test very thin. Sculpture consisting of numerous small conical tubercles which are smooth at their summits and marked with fine radiating grooves below. On some of the bony plates of the shield the tubercles are isolated and scattered, but in others they are arranged very distinctly in concentric lines separated by continuous furrows. Besides the tubercles, the surface is marked by certain superficial grooves, which are represented in the woodcut by unbroken lines. The general direction of most of these grooves is longitudinal, and the most strongly marked are those which run from the antero-lateral (*e.e.*) to the postero-lateral angles (*a.a.*) and which are nearly parallel to the sides of the shield. Sutures scarcely perceptible, their supposed outlines being indicated in the figure by dotted lines.

*Post-dorsomedian plate* (Fig. 2.)—Convex along the median line but highest in the centre, from which point there is a downward slope in every direction, the lateral slopes being most abrupt. Outline oblong but narrowing posteriorly so as to form a short beak. Anterior end somewhat rounded; sides parallel for more than two-thirds of their length, then attenuating rapidly into a point with obliquely concave sides. Maximum breadth equal to about one-third the entire length; apex of the beaked extremity curved slightly upwards. Tubercles arranged concentrically but not in distinct rows, those in the centre being the smallest and those near the circumference being both distant and of comparatively large size.

*Preventrolateral plates* (Fig. 3.)—Flat; longitudinally subreniform, a little longer than broad; outer margin concavely emarginate and inflected. Tubercles isolated, crowded and arranged obscurely in concentric, subparallel lines.

*Ventromedian plate* (Fig. 4.)—Flat; subrhomboidal, but with all the sides unequal and the margins of two of them (the right anteriorly and the left posteriorly) shallowly concave. Posterior extremity rather more produced than the anterior; length about one-third greater than the breadth. Tubercles arranged in distinct rows on three sides, but not on the left side of the posterior half, where they are nearly all isolated, those towards the centre being comparatively large, and those near the centre very minute and densely crowded.

More than twenty well preserved and tolerably perfect specimens of the cranial shield have been collected, besides numerous fragments, but the suborbital plate is invariably absent and the supposed rostral plate is only preserved in place in one specimen. The whole of these shields, too, appear to have been flattened by pressure, and if so, they may once have been longer in proportion to their breadth than they are now, and the anterior sinus into which the rostral plate fits may have been narrower and deeper.

The few detached plates yet found are rarely perfect, though the sculpture of their outer surface is generally well presented.

In some respects, the Campbellton *Coccosteus* very closely resembles the *C. cuspidatus* of Agassiz, but in others there are such marked differences between the two forms that it is thought most prudent, for the present, to distinguish the Canadian species by a local name. No detailed description of *C. cuspidatus* has been ever published and the illustrations that give the best idea of its character are the figs. on Plate III of the "Old Red Sandstone." Assuming that these figures are essentially correct, the shape of the post-dorsomedian plate of the Campbellton *Coccosteus* (which Agassiz, who calls it the dorsal plate, regards as offering one of the best specific characters) and that of the diamond shaped ventro-median are almost exactly similar to those of *C. cuspidatus*. But on the other hand, in many of the plates of *C. Acadicus*, and especially in some which have not been separately described, on account of the uncertainty of their homologies, but which are supposed to be isolated dorso-median plates of exceptionally large individuals, the tubercles are arranged in very distinct concentric lines, with continuous and comparatively broad grooves or spaces between them—an arrangement not indicated at all, or at most very obscurely, in the figures of *C. cuspidatus*. Again, the superficial grooves on the cranial shield of *C. Acadicus* are much more like those of *C. decipiens* as represented in a woodcut in the "Foot-Prints of the Creator," (third edition, fig. 11) than they are like those in the figure of *C. cuspidatus* in the "Old Red Sandstone." In the *C. Acadicus* the most conspicuous of these grooves are constantly those which run from *a* to *e* on the accompanying diagram, and from the centre of each of these lines to the lateral notches at *b.b*. Making allowance for distortion, precisely similar grooves are to be seen in Miller's woodcut of the "cranial buckler" of *C. decipiens*, but they are entirely absent in his figure of the cranial shield of *C. cuspidatus*. Further, in the Campbellton *Coccosteus* other superficial grooves run from *e.e* and *d.d*. to *f.f*. in such a way as to inclose a triangular space on either side, with a space between their inverted apices at *f.f*. This again, is just the arrangement in the "cranial buckler" of *C. decipiens*, whereas in *C. cuspidatus* the apices of the two triangles are not separated by a space but connected by a curved, transverse groove. It would seem, therefore, that the *C. Acadicus* may be distinguished from *C. decipiens* by the different shape of the post-dorsomedian plate, from *C. cuspidatus* by the different arrangement of the grooves on the outer surface of its cranial shield, and from both by the peculiar sculpture of its bony plates.

#### CTENACANTHUS LATISPINOSUS, *Whiteaves*.

(Plate X, figs. 3, 3 *a*, *b*.)

*Ctenacanthus latispinosus*, Whiteaves, 1881. Can. Nat. and Quart. Journ. Sc., N. S., Vol. X., p. 99. (Compare *C. ornatus*, Agassiz. Rech. sur les Poiss. foss., Vol. III, p. 12, tab. 2, fig. 1.)

Fin spines small, as compared with those of most of the other species of the genus, compressed laterally; either elongated, slightly curved and tapering rapidly from a rather broad base to an obtuse point, or comparatively short, straight and triangular. Posterior margin somewhat concave and bearing on its upper portion certainly one row

and presumably two rows of short, conical hooklets, which curve obliquely downward. Anterior margin thin, straight or gently convex, and unarmed. Surface marked on each side by from fifteen to twenty longitudinal ribs which swell out at regular intervals of about one-third of a line apart, into subangular, equidistant nodes.

Length of the largest spine collected, about two inches and a half; maximum breadth of the same at the base, about three quarters of an inch.

The few spines of this species collected by Mr. Foord are all partly imbedded in the matrix, so that the grooving of the posterior margin is hidden from view, and only one row of hooklets is exposed.

HOMACANTHUS GRACILIS, N. Sp.

(Plate X, fig. 4.)

*Homacanthus*, Sp. Undt. Whiteaves, 1881. Can. Nat. and Quart. Journ. Sc., N. S., Vol. X, p. 99. (Compare *H. arcuatus*, Agassiz, Poiss. foss. du Vieux Grés Rouge, p. 113, tab. 33, figs. 1-3).

Fin spine rather large (for a *Homacanthus*), compressed laterally, distinctly curved, slender, elongated and tapering very gradually from a narrow base to an apparently obtuse point. Upper portion of the posterior margin armed with one or more rows of conical hooklets, which curve obliquely downwards. Surface ornamented by about seven longitudinal ribs on each side, which are minutely and obliquely striated.

Length of the actual specimen (in which the apex of the spine is broken off) twenty-three millimetres. Breadth of the same, at the base, about six millimetres.

Only one imperfect and badly preserved specimen was obtained, one side of which is buried in the matrix. It differs from the spines of *Ctenacanthus latispinosus* in its more slender proportions, more arcuate form and apparently also in its surface ornamentation. As far as can be ascertained at present, this spine appears to be very similar to the *H. arcuatus* of Agassiz, in almost every respect but that of size, the Campbellton species being much the larger of the two.

IX.—*On the Nymphaeaceæ.*

By GEORGE LAWSON, Ph.D., LL.D.

(Read May 22, 1888, with subsequent additions.)

## PART I.

*Structure of VICTORIA REGIA, Lindley.*

## (Abstract.)

An account was given of the general conformation, and of the arrangement of tissue systems in the organs, of plants belonging to the Natural Order *Nymphaeaceæ*, or Water Lilies, and of special features in their organization and minute anatomy. The South American Water Lily, *Victoria regia*, had been, many years ago, fully described and illustrated, in respect to its general botanical characters and history, successively, by Dr. Lindley, Sir William Jackson Hooker, Mr. Thomas Moore, and the author of the present paper. As regards its minute structure, it was more carefully studied by M. Planchon, whose researches were published in the *Flore des Serres*, Vol. VI, p. 249, etc., and by M. A. Trécul, who illustrated the more important facts of its structure and development of organs in the *Annales des Sciences Naturelles, Botanique*, ser. 4, I, pp. 145–172. Some of the facts well known a quarter of a century ago seem to be forgotten now. Lately, De Bary, in the “Comparative Anatomy of Phanerogams and Ferns,” and J. H. Blake, of Cambridge, in Balfour’s “Annals of Botany,” August, 1887, questioned the explanations given of the structure of the prickle in the *Victoria*, so far as regards the nature and function of the ostiole or depression at its apex. The author of the present paper had shown, as long ago as 1855, the true character of these prickles, and that the so-called ostiole had no special function, as had been argued (and inferentially was not pathological, as now suggested by Blake), but that it was “a simple depression in the apex of the prickle of no physiological importance,” (*Proceedings Bot. Soc. Edinburgh*, November, 1855.) In the same paper it was shown that the stomatodes, or perforations of the leaf, were not mere holes caused by insects, as argued by Trécul, and now accepted on his statement by Blake, but special structures of uniform size, formed by a surrounding margin of modified cells; further, that they were comparable with the more complete reduction of parenchymatous tissue seen in many submerged plants, and especially in *Ouvirandra fenestralis*; moreover, their probable special function, as a contrivance for securing the drainage of water from the upper surface of the gigantic, tray-like leaf, with upturned margin, was indicated.

A series of large, coloured drawings, illustrating the microscopical structure of the

*Victoria regia* was shown. These drawings were prepared by Dr. Lawson, from observations made partly on the Royal Water Lily that was so successfully grown in an open air pond, in Knight and Perry's Nursery, King's Road, Chelsea, in the autumn of 1851, and partly on material obtained from a plant that flowered in the Botanic Garden of Glasgow, in 1855, and of which an account was given in Section D of the British Association at the meeting held that year in Glasgow. These drawings showed the epidermis and stomata, with their chlorophyll granules, of the upper surface of the leaf; the surface-cells, hairs, and what were regarded as the basal cells of aborted hairs, of the under surface; the prickles in several aspects and sections, exhibiting their cellular structure, the ostiole, etc.; the intercellular air-spaces of the leaves, and the large, stellately branched processes projecting into them, with bead-like markings on their surface; colouring matter of the under surface leaf-cells, the depth of colour markedly different in contiguous cells; the so-called stomatodes or perforations of the leaf, margined by more or less oblong, flat-sided cells, filled exclusively with red or rosy colouring matter; the upper surface petal-cells, with thick, translucent, slightly plicate or crimped cell-walls, and filled with colouring matter of a rose-colour of diverse depths of shade in different parts of the petal.

## PART II.

### *Nomenclature of Nymphæaceæ.*

In the Bulletin of the Torrey Botanical Club, of New York, for September, 1887 (XIV, p. 177), Prof. Edward L. Greene, of the California University, called attention to the circumstances attending the separation from the old genus *Nymphæa* of the yellow-flowered Water Lilies, or "Pond Lilies," as they are usually called in Canada, into a distinct genus, the *Nuphar* of Smith, who published it in Sibthorp's "Flora Græca" in 1806. Prof. Greene pointed out, what he supposed was unknown to English botanists that Salisbury's work in separating the white from the yellow-flowered Water Lilies was published prior to the appearing of Smith's generic name *Nuphar* for these plants, for the plate in "Paradisus Londinensis" bearing the figure and the name of Salisbury's *Castalia magnifica* was issued in October, 1805. He accordingly urged the restoration of Salisbury's generic names: *Nymphæa* for the yellow-flowered or nuphar species (= *Nuphar*, Sm.), and *Castalia* (= *Leuconymphæa*, Boerhave, pre-Linnæan) for the more showy kinds with red, white, or blue flowers.

In the Torrey Bulletin for December, 1887 (XIV, p. 257), Prof. Greene returned to the subject, further establishing the priority of Salisbury's division of the genus by additional references. In that communication he contended that the oldest Linnæan or post-Linnæan names are those which genera must bear,<sup>1</sup> and that *Castalia*, of Salisbury, is the oldest name, not pre-Linnæan, for the genus that botanists have been calling *Nymphæa*. He quotes, from Sir James Smith's published correspondence, the letter of the latter to Dr. Samuel Goodenough, Bishop of Carlisle (Sir James's adviser in classical matters),

<sup>1</sup> It is not to be forgotten that certain genera which have come down to us from pre-Linnæan times are the result of the accumulated observations and sagacity of successive generations of botanists.



proposing to replace Salisbury's name *Castalia* by *Nymphæa*, and to give to the yellow Water Lilies the name *Blephara*: the Bishop did not approve of this last name, and recommended *Nuphar* or *Madonia* for the yellow kinds. Prof. Greene, not having Salisbury's original paper in the *Annals* to refer to, nor apparently any publication relating to the treatment of the question by Salisbury's contemporaries, except the published correspondence of Smith, was unfortunately led into the mistake of supposing that "the action of Smith was a deliberate attempt to suppress—relegate to oblivion, if he might—Salisbury's monograph as a whole, and to banish his name, in so far as might be possible, from all connection with the nomenclature of these plants." Such a charge, if sustained, would form an indelible stain upon the history of botany in England, for to no botanist is England more indebted than to Smith, who devoted his life, energy and fortune to the advancement of English botany, at an opportune time when such devotion and services could not fail to yield conspicuous results. Botanical science then made rapid progress, a taste for it was widely spread throughout Great Britain, and preparation made for the still more advanced and extended work of the Hookers. I am sure that English botanists entertain grateful feelings towards the memory of Sir James Edward Smith, who was, in his time, the leader in English botany, author of the best works (with exception, possibly, of that of Withering), that had appeared descriptive of English plants, and he moreover conferred lasting benefits upon science by purchase of the Linnæan Herbarium and establishment of the Linnæan Society.

Mr. James Britten, F.L.S., took up Prof. Greene's suggestions, in the *Journal of Botany, British and Foreign*, for January, 1888, (of which he is editor), and was enabled, by judicious use of the abundant literary material under his hand, to supply the references requisite for completion of the proofs of priority, and to place the whole subject in a clear and concise form before English botanists. He did not, however, explain fully the facts bearing upon the charge made, evidently under misconception, by Prof. Greene against Sir James Smith. He also alluded to Prof. Greene's statements, probably in haste of writing, as the "latest discovery" in regard to priority of nomenclature, forgetful of the fact that there is no trace in our botanical literature of any one having ever doubted that Salisbury's generic names were prior, in point of time, to those of Smith, which have been generally followed. The repeated expression "latest discovery," coming from a botanist with such ample facilities of reference as an officer of the British Museum, would naturally favor the assumption implied in Prof. Greene's communications that Salisbury's memoir had lain a dead letter, unknown or uncared for by his contemporaries and successors, and had been specially "suppressed," "relegated to oblivion" by Smith. These charges against the botanists of England in general, and Sir James Smith in particular, are apparently further fortified by a quotation from M. Planchon's paper in *Annales des Sciences Naturelles, Botanique*, ser. 3, XIX, p. 59, characterising Smith's action as unjust, and probably prompted by a spirit of antagonism.<sup>1</sup> All these writers have overlooked the facts, abundantly recorded, and of which proofs are offered in this paper: (1) that the separation of the two generic groups, *Castalia* and

<sup>1</sup> "On doit blâmer Smith d'avoir, probablement par esprit d'antagonisme contre l'ingénieux Salisbury, bouleversé à plaisir la nomenclature proposée par ce dernier botaniste. Il est trop tard sans doute, pour revenir sur cette injustice qui fut en même temps une maladresse: les termes resteront comme ils sont, à cause que l'usage les a consacrés, mais on saura du moins de quel côté se trouvaient le droit et la raison." Planchon.

*Nymphæa*, as he called them, was acknowledged by his contemporaries to be due to the sagacity of Salisbury; (2) that the name *Castalia* was at first adopted by Woodville and Wood, in Rees's Cyclopædia, and by other authors, under protest as to the reason for its choice, with correction of the needless changes which Salisbury made in specific appellations, and restoration of the already established ones; and (3) that the generic names proposed subsequently by Smith have been preferred, not from any feeling of antagonism to Salisbury, or desire to lessen his merit, but for reasons that were freely expressed at the time, and held weight subsequently with botanists, so long as every other consideration was not swept away by the now all-prevailing priority idea. Even now, some who incline to accept the name *Castalia*, in itself unobjectionable, in deference to the desire to give preference to priority, may not appreciate Mr. Salisbury's reasons for its selection, which no doubt formed the real obstacle to its adoption at a time when descriptive suitability and propriety of sentiment were thought to be of consequence.

Mr. Britten says: "In 1808 (or 1809) Smith (Fl. Græc. Prodr., I, p. 361) adopted Salisbury's division of the Linnæan genus *Nymphæa*, but did not follow Salisbury's nomenclature. He restricts the name *Nymphæa* to Salisbury's *Castalia*, while he bestows upon the yellow-flowered species, for which Salisbury retained the name *Nymphæa*, a new name *Nuphar*." It is shown that the part of the Prodrômus containing *Nuphar* did not appear until the end of 1808, or, more likely, the beginning of 1809.

Mr. Britten, unlike Prof. Greene, acquits Smith from "displaying any animus against Salisbury personally." He indeed points out Smith's recognition of the correctness of Salisbury's division of *Nymphæa*, in the "Introduction to Botany," to which Mr. Joseph F. James has also called attention, in Torrey Bulletin, Feb. 1888. "I believe," says Smith, "Mr. Salisbury's *Castalia* is well separated from *Nymphæa*." Smith wrote to Bishop Goodenough stating his wish to retain *Nymphæa* for the showy-flowered species, and to adopt *Blephara* for the yellow-flowered ones. Britten quotes Goodenough's reply: "You must and you do reject Salisbury's *Castalia* upon irrefragable [here Britten interjects, 'i.e., classical'] grounds." Not being able to refer to the Smith correspondence at present, I cannot ascertain how far this interpolation is justifiable, but apparently the real ground was notorious at the time and did not need reference in correspondence between Goodenough and Smith. That Salisbury's nomenclature, weighted with so many needless changes, should not have been adopted with alacrity by his contemporaries will not surprise anyone acquainted with the spirit and literature of the time. Salisbury's antagonism to certain Linnæan ideas, and his attempts to belittle Linnæus and repudiate Linnæan names, his constant desire to change specific names (at that time regarded as more inviolable than generic ones), and the special objection to *Castalia*, not as a name, but on account of the analogy with which he sought to justify it, and which brought down upon him the rebuke of the authors of the article in Rees's Cyclopædia, are quite sufficient to explain why Salisbury's proposed nomenclature was not at once adopted, and to show that the responsibility did not lie with Smith, but with the botanists of the time, who, then few in number, were more disposed to consult and act in concert in such matters than is the custom, or is indeed practicable, now. What could be more frank than Sir James's acknowledgment of Salisbury's merits, as expressed in the quotation already cited from his Introduction to Botany, and in the article NYMPHÆA in Rees's Cyclopædia (XXV.) After noticing the varying views of Linnæus at different times as to the

affinities of the order, Smith says: "We heartily concur with Mr. Salisbury's decision concerning the affinities of the genus, though not in the name, which he has transferred from the true plant of the ancients, and replaced by *Castalia*, a word incorrect in etymology as well as meaning, and altogether superfluous."

It is not desirable that space should be occupied here with discussion of the laws of nomenclature, which will need to be dealt with by botanists ere long on wider principles than have been hitherto recognised. It may be remarked, however, that the "law of priority" is no doubt, as has been expressed, "the only sound principle." The difficulty is to secure agreement as to what is meant by priority, and whether it should apply to generic and specific terms separately, or only when these are united or combined as names, and how far authorities for them are to be used in cases where terms are not strictly equivalent. Many subsidiary questions arise, rendering uniformity difficult. Mr. Beeby justly observes, that something more is required than the hunting-up of the oldest name ever applied, but sometimes applicable only in the most general way; the far more difficult task remains of finding out the oldest name which is sufficiently exact in meaning to be applicable in a strict sense to the plant it is intended to represent. The fact is, that while general rules are useful as a guide, individual cases must be judged on their own merits. Bentham, as a classicist and philologist, adopted the idea that a specific term, being usually an adjective, was not in itself complete without the substantive generic word; that the combination of the two formed the name, to which alone the law of priority would consequently apply. Prof. D. C. Eaton, in his magnificent work on the Ferns of North America, lays down the same rule. The way in which Linnæus indexed his books, giving first an Index Generum, then an Index Synonymorum, and lastly an Index Triviale, does not lend favour to this view, neither does his custom of joining together generic and specific names of different genders. But there is a strong and a practical argument against it in the practice adopted by chemists, with results so satisfactory, in the naming of the elements, and of their chemical compounds—of groups, radicals, bases, acids, and the salts and complex compounds formed by their union. The names of the elements, or of simple or, as we may call them, Elementary groups (radicals), are always treated as complete terms, even when used in adjective forms, and are, as far as conveniently possible, expressed, in form suitably modified, in the name of the more complex compound, just as symbols are treated as perfect, complete and immutable terms in the construction of formulæ. We shall never have a permanent system of nomenclature of plants, until generic and specific names (so called) are treated in the same way as separate terms, essentially complete in themselves, and available for permanent use by combination in the construction of binary names.

As Mr. Britten states, the second volume of *Annals of Botany*, in which Salisbury's paper was printed, is dated on the title page 1806 (there are no dates of publication on the parts as bound in volumes); "but internal evidence shows that this first part was issued in 1805." As the internal evidence is not very obvious, and the *Annals* contain other important memoirs bearing on questions of priority, it may be worth while to determine, with some approach to accuracy, the actual date of publication. This work is styled on its title page "*Annals of Botany*. Editors, Charles Konig, F.L.S., and John Sims, M.D., F.L.S." (London. "Vol. I, 1805." "Vol. II, 1806.") These dates of publication are so quoted in DeCandolle's "*Systema Naturale*." The complete work forms two

octavo volumes of nearly 600 pages each, with plates. It was issued in form of periodical parts, each part containing a number of memoirs, followed by "Miscellaneous Articles," consisting of correspondence, botanical news, etc. This division of matter affords the only key to distinguish the separate parts in the bound volumes. The first part (of Vol. I) probably appeared on May 1st, 1804, which is the publication date on the frontispiece portrait of John Ray. The Edinburgh Review for July, 1804, acknowledges receipt of *Annals of Botany*, No. 1, price 7s. 6d., in list of publications received from April 18th to July 7th, 1804. The third and last part of Vol. I contains an obituary notice of Prof. Allioni of Turin, who died July, 28th 1804. The next part, the fourth (being first of Vol. II) is the one that contains Salisbury's paper. This fourth part is acknowledged in the Edinburgh Review for July, 1805; it contains a letter from Dr. Smith (Sir J. E.), dated Norwich, March 24th, 1805, and one from Dawson Turner, dated Yarmouth, May 17th, 1805,—a short communication not likely to have lain over long for publication. These facts indicate that the part could not well have been issued before the end of May, or later than the end of June, 1805. Thus, as nearly as can now be ascertained, Salisbury's "Description of the Natural Order of *Nymphææ*" was published in June, 1805.<sup>1</sup> In this paper he divided the genus *Nymphæa* of Linnæus into three distinct genera, of which, with some others that Linnæus had no knowledge of, he constituted the Natural Order "*Nymphææ*," placing it between the orders *Ranunculaceæ* and *Papaveraceæ* of Jussieu. His genera and species are as follows, the genus *Cyamus* being adopted from Smith:—

<i>Nymphæa umbilicalis</i> ,	= <i>Nymphæa lutea</i> , <i>Linn.</i>
<i>arifolia</i> ,	= <i>N. advena</i> , <i>Sims.</i>
<i>sagittæfolia</i> ,	= <i>N. longifolia</i> , <i>Michx.</i>
<i>Castalia pudica</i> ,	= <i>N. odorata</i> , <i>Kenn.</i>
<i>speciosa</i> ,	= <i>N. alba</i> , <i>Linn.</i>
<i>scutifolia</i> ,	= <i>N. cærulea</i> , <i>Sims.</i>
<i>stellaris</i> ,	= <i>N. stellata</i> , <i>Kenn.</i>
<i>Castalia ampla</i>	= <i>N. fol. amplioribus</i> , etc., <i>Brown, Jam.</i>
<i>mystica</i>	= <i>N. Lotus</i> , <i>Sims.</i>
<i>edulis</i>	= <i>N. Coteka</i> , <i>Roxb. MS.</i>
<i>Euryale ferox</i> .	
<i>Hydropeltis pulla</i>	= <i>Hydropeltis purpurea</i> , <i>Michx.</i>
<i>Cyamus mysticus</i> ,	= { <i>Nymphæa Nelumbo</i> , <i>Linn.</i>
	{ <i>Nelumbium speciosum</i> , <i>Willd.</i>
<i>flavicomus</i> ,	= <i>Nelumb. luteum</i> , <i>Michx.</i>

The following formed a list of "Species Dubiæ":—*N. lutea*  $\beta$ . *Kalmiana*, *Mich.*; *N. pentapetala*, *Walt*; *N. Nelumbo*, *Walt*; *N. reniformis*, *Walt*.

In the same year, as Mr. Britten informs us, Mr. William Hooker, a London artist (whose memory is perpetuated in the water-color called "Hooker's Green"), published in the *Paradisus Londinensis* the plate lettered *Castalia magnifica*, and dated October 1st, to which Mr. Salisbury supplied the letterpress.

<sup>1</sup> The explanation of the year 1806 appearing on the title page, is seen in the fact that the last part of the volume, and final part of the work, was delayed, and could not have been issued until that year, for it contains a letter dated Irkutsk, April 24, 1806.

As already stated, Sir James Smith, in 1808 or 1809, adopted Salisbury's division of *Nymphæa*, but not his nomenclature, retaining the name *Nymphæa* for Salisbury's *Castalia*, and giving the new name *Nuphar* to the yellow-flowered species.

In his paper in the Journal of Botany, Mr. Britten has revised the genera *Castalia*, Salisb., and *Nymphæa*, Salisb., and given a Synopsis of the "correct nomenclature" of the Salisbury species, noticing the difficulty in regard to Salisbury's *Castalia mystica*, on account of its including three plants, which Mr. Britten assorted as follows:—

*C. mystica*, Salisb. (the Egyptian and African *N. Lotus*.)

*C. sacra*, Salisb. in Paradisus, (the Indian, *N. Lotus*.)

*C. thermalis*, Britten (the Hungarian, *C. mystica*.)

Prof. Greene followed up Mr. Britten's readjustment of the *Castalias* (Torrey Bulletin, March, 1888, XV, p. 84), by renaming several North American species that the latter had not taken up, as follows:—

*Nuphar polysepalum*, Engelm. = *Nymphæa polysepala*, Greene.

*N. rubrodiscum*, Morong. = *Nym. rubrodisca*, Greene.

*Nymphæa tuberosa*, Paine. = *Castalia tuberosa*, Greene.

*N. flava*, Leitner. = *C. flava*, Greene.

*N. elegans*, Hooker. = *C. elegans*, Greene.

Not being aware that the proper specific names of *Castalia alba* and *odorata* had been reestablished by Woodville and Wood, Prof. Greene also proposed the reinstating of these specific names under the new generic term, in correction of Salisbury's "wrong-doing" in changing them respectively to *speciosa* and *pudica*.

#### THE GENUS *Castalia*, Salisbury.

The points at issue having been indicated, and mention made of the work of Prof. Greene and Mr. Britten in reviving Mr. Salisbury's neglected generic names, and revising the specific nomenclature accordingly, it is desirable here to give some history of the genus *Castalia*, and of its species, that have so long stood under the generic name *Nymphæa*.

The following table will show the equivalence of the generic name *Nymphæa* as used successively by leading systematists. The *Nymphæa* of Tournefort, Jussieu, and Willdenow, included the *Castalia* and *Nymphæa* of Salisbury; *Nymphæa* of Linnæus, and Hunberg, included *Castalia*, Salisbury, *Nymphæa*, Salisbury, and *Nelumbo*, Tournefort, which last was called *Cyamus* by Smith and Salisbury; *Nymphæa* of Smith, and of Bentham & Hooker, is equivalent to *Castalia*, Salisbury; *Nymphæa*, Salisbury, Greene, and Britten, is equivalent to *Nuphar*, Smith:—

<i>Nymphæa</i> , Tournefort, 1700	}	=	{	<i>Castalia</i> , Salisbury, 1805.
<i>Jussieu</i> , 1791				<i>Nymphæa</i> , " "
<i>Willdenow</i> , 1799				

Nymphæa, <i>Linnaeus</i> , 1762 } <i>Thunberg</i> , 1784 }	=	{ <i>Nelumbo</i> , <i>Tournefort</i> , 1700 = ( <i>Cyamus</i> , <i>Salisbury</i> .) <i>Castalia</i> , <i>Salisbury</i> , 1805. <i>Nymphæa</i> , " "
Nymphæa, <i>Smith</i> , 1808-9 } <i>Benth. &amp; Hook.</i> , 1862 }	=	<i>Castalia</i> , <i>Salisbury</i> , 1805.
Nymphæa, <i>Salisbury</i> , 1805 } <i>Britten</i> , 1888 }	=	<i>Nuphar</i> , <i>Smith</i> , 1808-9.

Of plants that come within the genus *Castalia*, *Salisbury*, only two nominal species were described by *Linnaeus*, in his genus *Nymphæa*, in the second edition of the "Species Plantarum" (Vol. I, published in 1762). We have seen that the genus itself, as defined and furnished with species by *Linnaeus*, was a composite one, including plants that, both before and after his time, were referred to separate genera. In like manner, the two *Linnaean* species of *Nymphæa* that are now referred to *Castalia* were both composite species, as we glean from the cited references to authors and the indications given of geographical range. The first, *N. alba*, included not only the White Water Lily of Europe—*Nymphæa alba*, *Camerarius* (1586),—but also, as indicated by the phrase "habitat in Europâ et Americâ," at least one other plant, which we assume to have been the common White Water Lily of the American continent, now known as *odorata*. The second species, *N. Lotus*, included the *Lotus Ægyptia* of *Pliny*, a name adopted by *Alpinus* (1672), and also the Jamaica species of *Brown* and *Sloane*,—"habitat in calidis Indiæ, Africæ, Americæ." The two original *Linnaean* species of the genus, then, were :—

1. *Nymphæa alba*, }
  2. *N. Lotus*, }
- { *Linnaeus*, Species Plantarum, 1762.

In the first edition of *Aiton's* "Hortus Kewensis" (1789), *Dryander* described, under name of *N. odorata*, a North American species that had been introduced to England by *William Hamilton* in 1786, and was identified with the *N. alba flore pleno odorata* of *Clayton*, in "Gronovii Flora Virginica" (1762) :—

3. *N. odorata*, *Dryander*, Hortus Kewensis, 1789.

*J. F. Gmelin*, in the third edition of the *Systema Naturæ* of *Linnaeus* (Leipzig, 1791), inserted the *N. reniformis* of *Walter's* Flora Carolina. *Willdenow*, in his amplified edition of the Species Plantarum, (1799), without recognising *Walter's* plant (then unknown in Europe except by the description in his work), increased the number of species to five by describing, (1) under name of *N. stellata*, the plant called Citambel in *Van Rhee'de's* Hortus Malabaricus ; (2) as *N. pubescens*, another East Indian species, with large toothed leaves, hairy beneath, characterised by *Plukenet* in the "Almagestum" as "*N. Indica*," etc. :—

4. *N. stellata*, }
  5. *N. pubescens*, }
- { *Willdenow*, Sp. Plantarum, 1799.

Before this time, however, another well-marked species had been discovered at the Cape of Good Hope by Mr. Francis Masson,<sup>1</sup> and was received in a living state at the Royal Gardens, Kew, having been brought to England in H.M.S. "Gorgon," in the year 1792. This species was described by Kennedy in Andrews' Botanical Repository, as *N. carulea* :—

6. *N. carulea*, Kennedy, Bot. Rep., 1801.

The above mentioned species were all dealt with in Salisbury's original paper, (except (5) *N. pubescens*, which was subsequently added in the *Paradisus Londinensis*), and two others were included for which binomial names had not been published before, viz., an East Indian species named in manuscript, with figure, by Dr. Roxburgh, as *N. Coteka*, and a plant in Brown's History of Jamaica, "*N. foliis amplioribus*," etc., which Linnæus had sheltered under the name of *N. Lotus* (No. 2 of the present list) :—

7. *N. Coteka*, Roxburgh, MS.

8. *N. foliis amplioribus*, etc., Brown, Hist. Jamaica, 1700.

The above list of eight numbers represents the materials upon which Salisbury's new genus *Custalia* was founded. In dividing the old genus *Nymphæa*, of Tournefort, into two new ones, he might well have retained the original generic name for the group which contained the greater number of species, and sought a new name for the one that included only three. Instead of doing so, he bestowed the well-established name *Nymphæa* upon the genus of few species, and selected a new sentimental one of doubtful taste for the larger genus. Not satisfied with this, he, further, without offering any reason or apology, ignored or changed all the specific names for these plants that had been established, and were in common use by his contemporaries, substituting others, mostly less descriptive, and in no case preferable. He changed the specific term of *Nymphæa alba*, essentially the White Water Lily, so named and known familiarly for centuries, to the (in this genus) meaning-

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<sup>1</sup> The memory of Francis Masson, long forgotten as a Canadian botanical collector, may be revived by recounting here a few particulars of his history. He was an able and industrious collector, through whom the Royal Gardens at Kew received many choice productions, especially from South Africa. Born at Aberdeen, in Scotland, August, 1741, he was first engaged in the service of H's Majesty George the Third, to collect for Kew, in 1771 or 1772, (in those days Kew was the King's Garden, and not a public or people's institution as now.) He was sent to the Cape of Good Hope, and remained there till 1776. Five years more were spent in exploring the Canaries, Azores, Madeira, and parts of the West Indian Islands. In 1783, he went to Portugal, thence again to Madeira, and, returning to England in 1785, he prepared for a second voyage to the Cape. He laboured there from 1786 to 1795, when he once more returned to England. In 1796 he published, at London, a folio volume of illustrations of new species of *Stapelia*, with forty-one coloured plates. In the following year (1797), having intimated his desire to be further employed on foreign service, Sir Joseph Banks mentioned the same to His Majesty, who was graciously pleased to order him to explore such parts of North America, under the British Government, as appeared most likely to produce new and valuable plants. "On this occasion he perished, in the sixty-fifth year of his age." He died at Montreal, about Christmas, 1805. Francis Masson's name is commemorated in the Cape genus of Liliaceous plants, *Massonia*, Thunberg, Nov. Gen., of which eight species were described in *Hortus Kewensis*, all discovered by Masson himself. In the *Systema Vegetabilium* of Schultes, (1830), the number was raised to seventeen, and by Baker, in *Linn. Trans.*, to twenty-five, but reduced in apparent numbers by separation of species referable to *Polyxena*, Kunth, of the *Scilleæ* tribe, *Massonia* being limited by Baker to species of the *Alliææ*, so that Bentham and Hooker's estimate is twenty. A Carribean Liliaceous plant is named *Sloanea Massoni*, Willd., Sp. Pl., ii, p. 155.

less term *speciosa*. The Sweet Scented Water Lily, *N. odorata*, was to be called *pudica*, which, in view of Salisbury's own expressed reason for choice of the generic term, also became meaningless. The Blue *N. cærulea* is called *scutifolia*. *N. stellata* is changed to *stellaris*, as if for no other reason than to give trouble to proof-readers, (just as he changed Walter's *N. sagittifolia* to *N. sagittæfolia*, spelling the latter name with an initial capital). *N. rubra*, essentially the Red Water Lily is changed to *magnifica*, which, like *speciosa*, means nothing, but, having acquired priority in print, will probably be retained. *N. Lotus* is bereft of its classical name and becomes *mystica* or *sacra*. Under the circumstances, it is not surprising that his contemporaries and successors did not adopt his proposed changes with alacrity, so long as it was the custom to avoid wilful and needless alterations, unless they were supported by some stronger plea than that of so-called priority, namely, that they had been proposed. That Salisbury knew he was acting in direct opposition to the views and feelings of his contemporaries, we have direct proof, for the part of the Annals immediately preceding the one in which his paper appeared, contains an expression of the opinions of its editors, Mr. König and Dr. Sims, in a review of the Flora Boreali-Americana of Michaux, in course of which it is remarked: "We have more serious objections to the frequent innovation this author [Michaux] has taken the liberty of making in botanical nomenclature; this disposition, which unhappily is too prevalent amongst the botanists of the continent cannot be too warmly inveighed against. . . . Some changes of names cannot, of course, be avoided, as the species must take the name of the genus to which it is found to belong; but in such case the trivial name should be sacredly preserved. . . . These strictures are not intended to arraign the new genera that M. Michaux has thought proper to raise from species before known, although this appears to have been sometimes done upon grounds too trivial to warrant such a change, so much as to condemn the unnecessary alteration of the specific name, and even frequently of that of the genus, without any good reason."

The following are the changes contained in Salisbury's paper; the initial capitals of his specific names (another needless change which he seems to have attempted to introduce) are not reproduced here:—

1. <i>Nymphæa alba</i>	changed to	<i>Castalia speciosa</i> .
2. <i>N. Lotus</i>	"	<i>C. mystica</i> .
3. <i>N. odorata</i>	"	<i>C. pudica</i> .
4. <i>N. stellata</i>	"	<i>C. stellaris</i> .
5. <i>N. cærulea</i>	"	<i>C. scutifolia</i> .
6. <i>N. Coteka</i>	"	<i>C. edulis</i> .
7. <i>N. pubescens</i>	"	<i>C. sacra</i> .
8. <i>N. foliis amplioribus</i> , etc.,	named	<i>C. ampla</i> .

An additional species, said to have the odour almost of the tuberosc, was introduced from China, in 1805, by the East India Company, in the ship "Winchelsea," Capt. Campbell; it was described by Salisbury in the Paradisus as *Castalia pygmæa*, and in Hortus Kewensis (following Salisbury's specific name only) as *Nymphæa pygmæa*. In Ledebour's Flora Rossica, (I, p. 84), it is identified with Gmelin's *N. alba minor*, which Willdenow, in Species Plantarum, II, p. 1153, had included (exc. syn. Morisoni) in his *N. odorata*. Another eastern species, named by Roxburgh in manuscript *N. rubra*, was



figured in the Botanical Repository and in the Botanical Magazine, and described in Hortus Kewensis, under that name; but changed in the Paradisus to *Castalia magnifica*. Thus the following names have to be added to the list:—

9. *N. pygmæa* = *C. pygmæa*.  
 10. *N. rubra* = *C. magnifica*.

In Rees's Cyclopædia, which was commenced in the year 1802, and completed in 1819, consisting of forty-five heavy quarto volumes, consequently a larger work than even our present Encyclopædia Britannica, Salisbury's new generic name *Castalia* was adopted in the early part of the work, and formed the title of an article in Vol. VI, in which the several species were fully described. The author or authors of that article (probably either Dr. Woodville or Rev. Mr. Wood, or both, who are credited in the preface as having supplied the botanical articles in the earlier volumes) recognised the propriety of separating the Water Lilies into two genera, but, while adopting the name *Castalia*, disapproved strongly of the principle upon which it had been selected, and the false analogy upon which it was founded, as alike adverse to philosophical precision, truth, and delicacy of sentiment.

The descriptive and technical portions of Salisbury's paper are in Latin. His reason for selecting the name *Castalia* is given in these words:—"Quasi ob pudicitiam, utrum totum petalis occultant species hujus generis; itaque *Castalias* dixi." The authors of the Cyclopædia article evidently thought the comparison a fanciful and offensive one; they say: "We have adopted Mr. Salisbury's generic name, from a confirmed unwillingness to change any name once given, unless urged to it by the most cogent reasons; but, at the same time, we feel ourselves constrained to add that we cannot concur with that excellent botanist in the principle on which he has been induced to choose it, no less adverse to philosophical precision and truth than it assuredly is to moral purity, and to that delicacy of decorum, which is one of the best characters of a rightly cultivated mind."

In this Rees's Cyclopædia article, which has been entirely overlooked by writers on the subject, both in England and America, the unnecessary changes introduced by Salisbury in the specific names are rectified by reinstating the original ones and conjoining them with the new generic term.

In a subsequent volume (XXV) of the same work, these plants are again described in article NYMPHÆA. It is understood that all the botanical articles from letter C, in the Cyclopædia, were written by Sir J. E. Smith;<sup>1</sup> an allusion to his "Prodromus Floræ Græcæ" bears direct evidence that this article was from his pen, and it is so quoted in DeCandolle's Prodromus. In this second article, the generic name *Castalia* is discarded and *Nymphæa* substituted (the Yellow Water Lilies being described in another article in the same volume under the generic name *Nuphar*). The following list will show the names under which the several species are respectively described in the two articles referred to; the arrangement and numbering are adjusted, as far as practicable, to correspond with the lists preceding in the present paper:—

<sup>1</sup> See English Cyclopædia, Biography, article: SMITH, JAMES EDWARD.

## REES'S CYCLOPÆDIA.

Vol. VI. (Woodville and Wood.)	Vol. XXV. (J. E. Smith.)	Vol. VI. (Woodville and Wood)	Vol. XXV. (J. E. Smith.)
1. <i>Castalia alba</i> =	<i>Nymphæa alba</i> .	7. <i>C. pubescens</i> =	<i>N. pubescens</i> .
2. <i>C. Lotus</i> =	<i>N. Lotus</i> .	8. <i>C. ampla</i> =	
3. <i>C. odorata</i> =	<i>N. odorata</i> .	9. =	<i>N. pygmæa</i> .
4. <i>C. stellata</i> =	<i>N. stellata</i> .	10. <i>C. magnifica</i> =	<i>N. rubra</i> .
5. <i>C. cærulea</i> =	<i>N. cærulea</i> .	11. =	<i>N. nitida</i> .
6. <i>C. edulis</i> =		12. =	<i>N. versicolor</i> .

A. P. DeCandolle having elaborated the *Nymphaeaceæ* very carefully for his *Regni Vegetabilis Systema Naturale* (1821), we have his results in the following list, in which the species are arranged in order, and with numbers to correspond to those already given:—

DECANDOLLE, *Systema Naturale*, 1821.

1. <i>Nymphæa alba</i> .	11. <i>N. rubra</i> .
2. <i>N. Lotus</i> .	12. <i>N. nitida</i> .
3. <i>N. thermalis</i> .	13. <i>N. versicolor</i> .
4. <i>N. odorata</i> .	14. <i>N. cærulea</i> ( <i>stellata</i> , <i>var. Sims.</i> )
5. <i>N. stellata</i> .	15. <i>N. Madagascarensis</i> , ( <i>species nova</i> ).
6. <i>N. scutifolia</i> .	16. <i>N. pulchella</i> ( " ).
7. <i>N. edulis</i> .	17. <i>N. reniformis</i> .
8. <i>N. pubescens</i> .	18. <i>N. minor</i> ( <i>odorata</i> , <i>var. Sims.</i> )
9. <i>N. ampla</i> .	19. <i>N. blanda</i> .
10. <i>N. pygmæa</i> .	

DeCandolle's *Systema* having ceased with the second volume, the *Prodromus* (1824) took its place. The same nomenclature of the Water Lilies was retained in the latter work, with addition of a somewhat doubtful Chinese species:—

20. *N. acutiloba*.

Not a few new species have been subsequently described by M. Planchon and other botanists, in the *Annales des Sciences Naturelles*, and other publications. A number of these have been founded on dried specimens in herbaria, and it is probable that a readjustment of them will be required when the living plants or better material become available for examination. Such was obviously the opinion of Bentham and Hooker when working on the *Genera Plantarum* (1862), for they did not include these novelties in their estimate of the number of species, which is given as twenty, the number described by DeCandolle nearly forty years before. Now that the Water Lilies are more generally cultivated, it may be expected that their specific relations will be more carefully studied. One disturbing influence will be found in the increasing number of artificial, as well as natural, varieties and hybrids, which, however, may prove of value as pointers of relationship in the study of allied forms. The Synopsis, that follows, necessarily imperfect, has been prepared with the special view of assisting in the further study of our Canadian and North American species, and South American and European forms allied to them; consequently the details given in regard to other species are very limited.

## PART III.

*Synopsis of NYMPHÆACEÆ.*

NAT. ORD. *Nymphaeaceæ*, DC., "Prop. Med., ed. 2, p. 119." Syst. Nat. II, p. 39. Bentham & Hooker, Genera Plantarum, I, p. 45. *Nymphaeā*, Salisbury, Ann. Bot., (1805), II, p. 69.

GENUS I.—VICTORIA, *Lindley*.

Lindley, Bot. Register Misc., 1838-9, p. 13. Endlicher, Genera Plantarum, No. 1519. Bentham & Hooker, Gen. Pl., I, p. 74.

VICTORIA REGIA, *Lindley*, l.c. Hooker, Bot. Mag., tt. 4575-4578, and separate Monograph, fol., with coloured plates. R. Brown, Proc. Linn. Soc. Lond., May 7, 1850. Henfrey, Gardeners' Mag. of Bot., May, 1850, p. 225, (coloured plates by Fitch). Lawson, Water Lilies, pp. 24-80, t. 1. Planchon, in Van Houtte's Flore des Serres, March, 1851. Walpers, Annales Botanices Systematicæ, (1857), IV, p. 152. Garden and Forest, pp. 308-309, with fig., (1888). Mr. Gray has argued that *Regina* not *regia* is the proper specific name. See Annals of Natural History, ser. 2, VI. p. 146. The form *regalis* has also been used.

*Euryale Amazonica*. Froriep's Notizen, 1832. Poeppig, ex Endlicher. Planchon, Revue Horticole, Feb., 15th 1853, (Walpers).

*Nymphaea Victoria*. Schomburgk, MSS.

*Victoria Amazonica*. Planchon, Revue Horticole, Feb. 15th, 1853 (Walpers).

*V. Cruziana*. D'Orbigny. Planchon, Ann. des Sc. Nat., Ser. 3, XIX, p. 27. Flore des Serres, VI, p. 210; VII, p. 35. Walpers l.c.

Bolivia, district Moxos, near River Mamore, 1801.—*Hænke*. Rio das Madeiras, 1832.—*D'Orbigny*. Near Ega, 1832.—*Poeppig*. British Guiana, in Rivers Berbice and Roupounoum, 1837-42.—*Schomburgk*. Jacouma, 1846.—*Bridges*. Amazon River, near Santarem, (Para.), April, 1850.—*R. Spruce*. Brazil, prov. Matto-Grosso, in Rio de Barbado.—*Walpers*, l.c. Paraguay (*V. Cruziana*).—*D'Orbigny*, who derives the native name, Yrupé, from *y*, water, and *rupe*, a dish.

The Royal Water Lily of South America, the most magnificent of all the *Nymphaeaceæ*, was first raised at Kew from imported seeds, and has now been in cultivation in some of the principal public and private gardens of Europe and America for about forty years, having first blossomed at Chatsworth in November, 1849. In its native lagoons, it appears to present considerable variation (as is not unusual in aquatic plants), and two of the most striking forms have been described as separate species; one of them is well marked, and pending further observation, is retained here as a variety, viz. :—

*Var. CRUZIANA*, distinguished by its uniform green leaves (not purple on the under surface) and larger black seeds; it may be distinct, but the description is imperfect. First found by M. A. D'Orbigny in 1827, on the river Parana, 900 miles from its junction with the Rio Plata.

GENUS II.—EURYALE, *Salisbury*.

Salisbury on *Nymphææ*, König and Sims' *Annals Bot.*, II, p. 73, (1805). Benth. & Hook., *Gen. Pl.*, I, p. 47.

EURYALE FEROX, *Salisb.*, l.c. Ait., *Hort. Kew.* ed. 2, III, p. 295. DC., *Syst.*, II, p. 48. *Prod.*, I, p. 114.

*Anneslea spinosa*, Roxb., *Fl. Ind.*, II, p. 573. Andrews' *Bot. Repos.*, t. 618.

*Euryale Indica*, Planchon, in *Ann. des Sc. Nat.*, ser. 3, XIX, p. 28.

India and China. Introduced into England, 1809, by the Marquis of Blandford.—*Hort. Kew.*

GENUS III.—BARCLAYA, *Wallich*.

*Trans. Linn. Soc. Lond.*, XV, p. 442, t. 18. Walpers, *Ann.*, IV, p. 167. Benth. & Hook., *Gen. Pl.*, I, p. 47.

BARCLAYA LONGIFOLIA, *Wallich*, l.c. Hook.  *Ic. Pl.*, t. 809–10, and in *Annales des Sc. Nat.*, ser. 3, XVII, p. 301, t. 21. Walpers, *Ann.*, IV, p. 168.

Burma.

GENUS IV.—CASTALIA, *Salisbury*.

*Annals of Botany*, II, p. 71, (1805). *Paradisus Lond.*, n. 14 and 58. *Nymphaea*. Smith, *Prod. Fl. Græc.*, I, p. 361. Benth. & Hooker, *Genera Plantarum*, I, pp. 46–47.

## List of species :—

- |                          |                           |
|--------------------------|---------------------------|
| 1. <i>C. alba</i> .      | 9. <i>C. cærulea</i> .    |
| 2. <i>C. tetragona</i> . | 10. <i>C. stellata</i> .  |
| 3. <i>C. odorata</i> .   | 11. <i>C. edulis</i> .    |
| 4. <i>C. tuberosa</i> .  | 12. <i>C. magnifica</i> . |
| 5. <i>C. elegans</i> .   | 13. <i>C. Lotus</i> .     |
| 6. <i>C. flava</i> .     | 14. <i>C. pubescens</i> . |
| 7. <i>C. ampla</i> .     | 15. <i>C. thermalis</i> . |
| 8. <i>C. gigantea</i> .  |                           |

1.—CASTALIA ALBA, Woodv. & Wood, *Rees's Cyc.* (art. *Castalia*), VI. Link, *Handbuch*, 1831, II, p. 405. Walpers' *Annales*, IV, p. 163. Greene, *Bulletin Torrey Bot. Club*, XV, p. 85.

*Nymphaea alba*, Linn., *Sp. Pl.*, ed. 2, p. 729, in part, (exclude the American plant). Roth, *Tent. Fl. Ger.*, I, p. 230, (1788). Gmelin, *Syst. Nat.*, ed. 3, II, p. 811, (excl. syn. Gmelin. Sibir.) (1791). Willd., *Sp. Pl.*, II, p. 1152. DC., *Syst. Nat.*, II, p. 56, *Prod.*, I, p. 115. Lawson, *Water Lilies*, p. 81, t. 2, (1850).

*Castalia speciosa*, *Salisb.*, *Ann. Bot.*, II, p. 72. "Besser, *Enumeratio*, p. 22, No. 639," (Ledebour). Britten, *Jour. Bot.*, XXVI, p. 9.

White Water Lily of England. Weisse Seerose of Willdenow, and other German authors.

Extends, in various forms, over nearly the whole of Europe, Algeria, etc.

*Var. MINOR.* *Nymphaea alba*  $\beta$  *minor*, (Besl., Moris.), Willd., Sp. Pl., II, p. 1153. DC., Syst. Nat.; Prod., l.c. Ledebour, Fl. Rossica, I, p. 84.

Russia. Alsace.

Flowers half the size of the normal form, leaf-lobes spreading, with an open space between.

*Var. PAUCIRADIATA.* *Nymphaea pauciradiata*. "Bunge in Ledeb., Fl. Altaica, II, p. 272." Ledeb., Fl. Rossica, I, p. 84.

River Bekun, an affluent of the Irtysh, between the Altai and Ural Mountains.

*Nymphaea pauciradiata*, so far as indicated in Flora Rossica, is certainly very closely related to *alba*, and can hardly be treated as a distinct species, and yet in some of its characters it approaches the Canadian *odorata*; the leaf-lobes are described as less closely approximate than in *alba*, and the lateral veins beneath canaliculate (plane in *alba*), stigma less than nine-rayed, petals obtuse (whilst in *alba* they are acute). There is also, closely related to this form (according to Dr. Caspary's observations) *N. biradiata*, Sommerauer, (Bot. Zeitung), described in Koch's Flora Germanica, I, p. 29, the leaf-lobes spreading, with rounded sinus-margins, stigma 5-10-rayed. The Bohemian *N. candida*, Presl (Rostinar), with an ovate-conical, smooth, naked ovary (only its lower third part hid by the petals and stamens), may also be referred here. "Presl, Deliciæ Pragenses, p. 224," (1822). Koch, Fl. Germ., I, p. 29.<sup>1</sup>

Several garden varieties are grown:—1. *Var. rosea*. In a paper in The Garden, (London), XXIII, pp. 334-336, (1883), it is stated that this variety, sometimes called *sphaerocarpa* and *Casparyi*, "a native of northern Europe, as far north as Sweden," was figured in that work (XV), having flowered at Kew in 1878. Mr. Frank Miles writes in the Garden of the same variety as *var. rubra*, "obtained ten years ago (he is writing in 1885) through Messrs. Henderson, of Professor Agardh, of Lund University, Sweden, from the University Botanic Garden; . . . two out of three seedlings are red like the parent. . . . The exact locality of this variety is not known, as Professor Agardh did not wish it to be exterminated" (The Garden, XXVIII, p. 653.) 2. *Var. candidissima* is described in the same paper, "a large, pure, white-flowered form, very floriferous, with flowers twelve inches in diameter when well-expanded." 3. *Var. Cashmeeriana* is either identical with, or closely resembles, the preceding.

Not without hesitation, I add the following synonym, being doubtful whether it may indicate a mixed nominal species or be referable to *C. alba* or *C. tetragona*:—

*N. nitida*, "Sims, in Bot. Mag., t. 1359." Smith, Rees's Cyc. XXV. DC., Syst., II, p. 58. Prod., I, p. 116, Ledebour, Fl. Ross., I, p. 84. Said by A. P. DeCandolle to be allied to *odorata* and *alba*,—rhizome perpendicular, branched, leaf-auricles obtuse, sinus narrow, points slightly spreading, veins impressed, lateral nerves plain on both sides, flowers inodorous, petals obtuse. On the other hand, the plant in cultivation in England, under

<sup>1</sup> For details in regard to the relations of these and other varieties, see Dr. Robert Caspary's Observations in Appendix to Index Hort. Berol., 1855, and Walpers' Annales, iv. 162-166.

this name, is described in The Garden as smaller than *alba*, with very pointed and narrow petals. In the Flora Rossica, Dr. Ledebour quotes the occurrence of *nitida* in Siberia on authority of DeCandolle alone, adding, "mihi ignota."

The Linnæan specific term *alba* is a very old one, as applied to this species, which had several binomial pre-Linnæan names: *Nymphæa alba*, Mathiolus, 1558. *N. candida*, Fuchs, 1542-45. *Nenuphar fœmina*, Brunfels, 1532-34.<sup>1</sup>

2.—C. TETRAGONA. *Nymphæa alba minor*, "Gmelin, Fl. Sibirica, IV, p. 184, t. 71," (1769), but not of Willdenow.

*Nymphæa tetragona*, "Georgi, Reise im Russischèn Reichs, I, p. 220, [1775], (ex Sims et ex herb. Pall.)" (DC).

*N. pygmæa*, Ait., Hort. Kew, ed. 2, III, p. 293, (1811). DC., Syst., II, p. 59. Prod., I, p. 116. Ledeb., Fl. Ross., I, p. 84.

*Castalia pygmæa*, "Salisb., Paradisus Londinensis, t. 68." Britten, Jour. Bot., XXVI, p. 9.

Characterised by its acute petals and eight-rayed stigma. The lateral nerves beneath are described by DeCandolle as plane (which they are in *alba* and *nitida*), but by Gmelin, as canaliculate.

3.—C. ODORATA, Woodv. & Wood, Rees's Cyc., VI. Greene, Bulletin Torrey Bot. Club, XV, p. 85, (1888).

*Nymphæa alba*, Walt., Fl. Carol, p. 155. Michaux, Fl. B.-Am, I, p. 311.

*N. odorata*, (Dryander) Ait., Hort. Kewensis, ed. 1, II, p. 227 (1789, not 1803, as stated in Journ. Bot). Willd., Sp. Pl., II, p. 1153, (except Gmelin's Eastern Siberian plant, referred to *tetragona*.) (Kennedy) Bot. Repos., t. 297, (1803). Torr. and Gr., Fl., N. Am., I, p. 57. Lawson in Miller's Wild Fl. of America. Provancher, Flor. Canad., p. 28. Macoun, Cat., p. 31. Watson, Bibl. Index, I, p. 38.

*Castalia pudica*, Salisbury, Ann. Bot., II, p. 72, (1805). Britten, Jour. Bot., XXVI, p. 9.

*The Fragrant Water Lily*. Wohlriechende Seerose, Willd.

As DeCandolle observes, this species has been much mixed up with the European *C. alba*, which, according to Torrey and Gray, was said by Nuttall to grow near Detroit. Possibly he had seen the then undescribed *tuberosa* there. Sixty years ago, Smith, in the English Flora (III, p. 14, 1825), described the leaves of *alba* as "a span wide, oval-heart-shaped, with nearly parallel or close lobes at the base, their radiating veins underneath not prominent, in which it differs from the American *odorata*." Dr. Caspary, after long

<sup>1</sup> Dr. Caspary classifies the modifications of *alba* into two groups:—1st.—*Melocarpa*, those whose pollen grains are aculeate, filaments more slender than the anthers, rays of the stigma mostly unicuspidate, carpels numerous (8-24), fruit more or less globose. 2nd.—*Oocarpa*, in which the pollen grains are not aculeate, but granular, stamens short with filaments about as broad as the anthers, rays of the stigma mostly unicuspidate, flavous, carpels fewer, 6-14, fruit ovate. He refers to MELOCARPÆ, *N. venusta*, Hentze; *N. rotundifolia*, Hentze; *N. erythrocarpa*, Hentze; *N. parviflora*, Hentze; *N. splendens*, Hentze; *N. urceolata*, Hentze,—all described in Botanische Zeitung, from 1848 to 1852. In the division OOCARPA, he includes *N. candida*, Presl, and of Ortman, Fl. Carlsbad; *N. biradiata*, Sommerauer, and other authors; *N. semiaptera*, Klinggræff and Deutschlands Flora, 1855; *N. neglecta*, Hausleutner, (Bot. Zeit., 1850); *N. Kostelezkyi*, Palliardi, (Index Hamburg. 1852); *N. cubogermen*, Lorinser; *N. intermedia*, Weiker, in Reich. Fl. Sax., 1842; *N. pauciradiata*, Bunge; *N. punctata*, Kar. et Kiril.; *N. Basniniana*, Turckczaninow, Ledebour, Fl. Ross., i. p. 743, who speaks of it as intermediate between *alba* and *pauciradiata*. See also Walpers' Annales, l.c.

and careful observation of the plants in cultivation at Berlin, distinguished *odorata* by the pollen grains being constantly aculeate, stipules subreniform, emarginate, appressed to the rhizome, flowers remaining strongly fragrant as long as open, whereas those of *alba* are only at first slightly fragrant.

The names of this plant have been used as examples, in the recent discussion on botanical nomenclature in the Journal of Botany. Mr. Britten (Kensington) insists upon the adoption of Salisbury's specific term *pudica*. M. Alphonse DeCandolle, who supports the rule of retaining the specific name when a species is transferred to another genus, adheres to the original term *odorata*, which Salisbury had no reason to change; "je n'ai jamais hésité sur ce point," (Journal of Botany, Oct., 1888, p. 289.) Mr. Britton (Columbia College) also argues for this view (*ibid.*, p. 295). His Kensington opponent is inexorable, and will not have the plant called "*Castalia odorata* (Dryand.) Greene," as it is styled in the New York List. There is no necessity, however, for calling it by that phrase, the proper name being *Castalia odorata*, Woodv. & Wood. Woodville and Wood were the botanists who first formally recognised Salisbury's genus, and the first to connect his generic name with the correct specific one.

*Var. MINOR.* Chiefly distinguished from the usual forms of the species by the small size of the leaves, with widely divergent basal lobes, and much smaller flowers.

*Nymph. odorata* var. *rosea*. Pursh, Fl. N. A., p. 369.

*N. odorata*, var. *minor*. Sims, Bot. Mag., t. 1652. Torr. and Gr., Fl. N. A., I, p. 57. Gr., Man., 5 ed., p. 56. Watson, Bibl. Index, p. 38. Macoun, Cat., p. 32.

*N. minor*. DC., Syst., II, p. 58. Prod., I, p. 116. Hook., Fl. B. A., I, p. 32.

I have examined specimens of this variety, which is very much rarer than the common form, in the Herbarium of the Geological Survey of Canada at Ottawa, as follows:—Near Belleville, Ont., July, 1877.—*Macoun*. Mirnaibi River, Ont., July, 1879.—*Dr. Bell*. Severn River, Kewatin, July 1886.—*Mr. James M. Macoun*.

This species has apparently a very wide range, extending, according to Torrey & Gray, "throughout N. America east of the Rocky Mountains," and possibly some of the described tropical forms are closely related to it. In Walpers' *Annales Botanices Systematicæ*, IV, p. 167, habitats are assigned as follows. "Delaware, Michaux, in Herb. Mus., Paris, (sub nom. *N. albæ*). Halifax, in Nova Scotia, Smith in Herb. Delessert. Texas, Drummond, *ibid.*, etc." It is abundant in many of the numerous lakes throughout Nova Scotia, especially in those whose comparatively still waters overlie deposits of the infusorial black mud, brought in by tributary streams, which by maceration slowly passes into diatomite. Abundant about Kingston, Bath, Odessa, etc., in Ontario. Lily Lake, New Brunswick.—*G. U. Hay*, Aug 1st, 1876.

As noted by Dr. Gray, this species, like *alba*, varies with rose-coloured flowers, and there is a variety known as *rubra*, grown at Kew and other gardens in England, "originally found by Mr. Sturtevant" in a "lake near Cape Cod," not in Newfoundland as stated, but in Barnstable, Massachusetts. Mr. Frank Miles remarks in *The Garden*, XXVIII, p. 653, that, in the open air in England it is as red as *Calba* var. *rubra*.

*Nymphæa Parkeriana*, Lehmann, Index Sem. in Horto Bot. Hamb., *Annales des Sc. Nat.*, ser. 4, I, p. 325, British Guiana, *Parker*, (*Lehm.*), appears to be closely related to *C.*

*odorata*,—the leaves suborbicular, reddish beneath, the lobes nearly parallel ending in sharp points, stamens appendiculate, the inner ones almost filiform.

4.—*C. TUBEROSA*, *Greene*. Torrey Bulletin, XV, p. 84.

*Nymphæa tuberosa*, Paine, Catal. Pl. Oneida, (1865). Gray, Manual, ed. 5, p. 56. Watson, Bibl. Index, p. 39.

The *Nymphæa reniformis* of Water's Flora Carolina, p. 155, has not been determined. Dr. Gray speaks of it (in Manual, ed. 5) as very obscure. Mr. Watson doubtfully refers it, and De Candolle's plant of that name (described from a Carolina specimen of Fraser), to *tuberosa*. Chapman, in the Southern Flora gives it, without comment, as a synonym of *odorata*. *Nelumbium reniforme*, Willd., Sp. Pl., II, p. 1,260. *Nymph. odorata*, var. *reniformis*, Tor. and Gr., Fl. N. A., I, p. 57. *Cyamus reniformis*, Pursh, Fl., p. 398. There appears to be little doubt, from DeCandolle's description (Syst. Nat. II, p. 55,) that Fraser's Carolina plant, from which it was taken, Presque Ile, was of this species. Mr. Watson quotes as synonyms, with a mark of doubt, *N. maculata* and *N. spiralis*, Raf. Med. Fl. II, p. 45.

Paine's Water Lily was first distinctly recognised in Oneida Lake, New York State but has been found also by Prof. Macoun in the Bay of Quinté, and along the margin of Lake Ontario, from Presque Ile eastward; its distribution has not yet been fully traced either in Canada or the United States, and, although it is said to be more southern in its range than *C. odorata*, we should remember that the latter species probably extends, in some of its forms, into South America.

This species of the American lakes had been long overlooked, or taken for a form of *odorata*, from which it differs in the shape of the rootstock, and in having small lateral tubers on the side of the larger ones. In cultivation, "the habit of pushing up its central leaves above the water, and almost perpendicular to the surface, is a distinguishing characteristic;" but the flowers hardly differ from those of *alba*. (Miles, in The Garden, in which the species is figured.) In specimens collected on the Bay of Quinté, Aug. 15th, 1888, by Prof. Macoun, the leaves resemble those of *alba*, being thick and green on both sides; they are about as broad as long, but the petiole is inserted below the middle of the lamina, which is strongly veined.

5.—*C. ELEGANS*, *Greene*, Bulletin Torrey Bot. Club, March, 1888.

*Nymphæa elegans*, Hook. in Bot. Mag., t. 4604, (1851). Lemaire, Jard. Fleur., II, t. 180. Walpers' Ann., IV, p. 159. E. E. Sterns, Bulletin Torrey Bot. Club, XV, p. 13, (1888).

Mr. Sterns states that, in June, 1849, specimens were collected by Dr. Charles Wright "in a pond near the head of the Leona River," in south-western Texas, which Dr. Gray referred doubtfully to *N. Mexicana*, Zucc.; one of the specimens sent to Sir William Hooker, and a seedling plant, enabled him to describe it as a new species. After an interval of forty years, specimens were received from Waco, in east-central Texas (collected by Miss Trimble and Miss Wright), which Mr. Sterns took at first for a small form of *odorata*, but, on careful examination and enquiry, determined to be identical with the long-lost *elegans*. The seeds he describes as globular (not oblong as in its ally), the sepals purple-lined, and the petals with purple-blue tips.

Mr. Thomas Morong describes, in the Botanical Gazette, May, 1888, XIII, p. 124, a supposed new Water Lily, under the name of *C. Leibergeri*, (with a footnote name, *Nymphæa*



*Leiberghi*.) It is a diminutive plant, said to resemble *pygmæa (tetragona)*, but with obtuse petals, which are described as faintly striped with purple lines (as in *elegans*), but the figure shows the leaf to be more elongated than in either of these species. The rhizome and seeds have not been seen. Its true relations remain to be ascertained.

6.—C. FLAVA, *Greene*, Bulletin, Torrey Bot. Club, XV, p. 85, (1888). "*Nymphæa flava*, Leitner in Audubon's Birds, p. 411, (1838)." The Garden XXIII, p. 334, with coloured plate; also XXVII, (1885, pp. 439 and 599). I cannot verify the reference to Leitner. There is no allusion to a Water Lily in the original edition of Audubon's Ornithological Biography, published at Edinburgh in 1831, nor any reference either to Leitner or *Nymphæa flava* in Pritzel's works, the Thesaurus Lit. Botanicæ or the Iconum Botanicarum Index.

"*N. lutea*, Treat, in Harp. Mag., LV, p. 365, (1877)," (Greene.) The Lemon-Yellow Water Lily of Florida.

This species is described as having flowered in the Harvard Botanic Garden in the spring of 1878, and in England in 1881. The drawings in "The Garden, prepared from plants that flowered at Kew, in August 1882," show the erect rootstock, covered with scale-like nodules, the young sagittate submerged leaves, and mature floating ones; also the lateral annual runners or stolons, which are thrown out, each ending in a permanent bud bearing leaves and flowers and forming a new plant. The flowers are lemon-yellow, an exceptional colour in this genus. Although described and named in botanical works only a few years ago, this plant is figured in Audubon's Birds of America. Mr. Frank Miles, writing in The Garden, (XXVIII, p. 653, Dec. 26, 1885), finds it hardy at Bristol, and says it has flowered in a pond in Kent. He speaks of it (from a cultivator's point of view, I presume) as the same, "or nearly so," as *Amazonica*.

7.—CASTALIA AMPLA, *Salisb.* Ann. Bot., II, p. 73. Britten, Jour. Bot., XXVI, p. 9. *Nymphæa ampla*. DC., Syst., II, p. 54. Prod., I, p. 115. Grisebach, Fl. West Ind. Islands, p. 11.

Jamaica. St. Domingo. (Large-leaved, white-flowered.)

8.—C. GIGANTEA, *Britten*, Jour. Bot. (Lond.), XXVI, 9, (1888.)

*Nymphæa gigantea*, Hook, Bot. Mag., t. 4647, (one flower filling double plate). The Garden, XXIII, p. 334, with plate.

*Castalia stellaris*, *Salisb.*, Parad. Lond., "quoad pl. Austral."—Britten.

*Victoria Fitzroyana*, Hort.

Native of Australia. Flowered in Van Houtte's nurseries, Paris, in 1855, and at Kew, where materials for the illustration in The Garden were obtained. The tubers are described as long and thick, with eyes scattered over their surface like those of potatoes. "There are three forms at Kew,—one [with flowers] a clear blue, another paler, and a third almost white," Flowers usually blue, but varying with white, rose and purple colours.

9.—C. CÆRULEA, *W. & W.*, Rees's Cyc., l.c. *Nymphæa cærulea*, " (Kennedy) Andr. Bot. Repos., t. 197, (Dec., 1801). (Dryander) Bot. Mag., t. 552, (Feb. 1802.)"

*Castalia scutifolia*, *Salisb.*, Ann. Bot., II, p. 72. Britten, Jour. Bot., XXVI, p. 9.

*N. scutifolia*, DC., Syst., II, p. 50., Prod., I, p. 114.

Cape of Good Hope, (*Masson, Thunberg*).

10.—C. STELLATA, *W. & W.*, Rees's Cyc., VI.

*Nymphæa stellata*, Willd., Species Plantarum, II, p. 1153. DC., Syst., II, p. 51., Prod. I, p. 115.

*Castalia stellaris*, Salisb., Ann. Bot., II, p. 72, exclude the Australian plant, which is *gigantea*. Britten, Jour. Bot., XXVI, p. 9. *N. Madagascarensis*, DC., Syst., II, p. 50. Prod., I, p. 114, is also referred to this species, together with forms in cultivation known as *cærulea*, *Capensis*, *parviflora*, *versicolor*, *cyanea*, *scutifolia*, *micrantha*, and *Daubeneyana*,—the last a reputed garden hybrid.

*Nymphæa Zanzibarensis*, Caspary, which first flowered at Kew in 1883, is referred, in The Garden, as a variety of *stellata*. It is figured and described in that work (1883) as having flowers nine inches in width. The flowers are described as blue or violet-purple in tint, and as having a delicate primrose scent. The descriptions given are not very assuring as to its place:—"Possibly this noble plant is an unusually fine form of the Cape species, *N. stellata*." "Only a form of the common African species, *N. stellata*." "Doubtful if it differs at all from the plant known as *N. scutifolia*." (The Garden, XXIII, p. 128.) *N. Zanzibarensis*, var. *fl. rubro*, "Siber., Gartenflora, jahr. XXXVI, heft 3, Græbener, ibid., jahr. XXXVI, heft 9."—Balfour, Vines and Farlow's Annals of Bot., I, p. lxxx.

A writer in the London Gardeners' Chronicle notices, under date June 9th, 1888, the flowering at Kew of a Water Lily obtained through seeds, under name of *N. Ortigiesiana* var. *Adele*, from M. Todaro of Palermo, but which proved to be not related to *Ortigiesiana*, which is a supposed hybrid of continental origin, so near *N. Lotus* var. *rubra* as to be scarcely distinguishable from it. *N. "Adele"* is regarded as a form of the African *stellata*: leaves irregularly notched and mottled, flowers three inches across, sweet scented, with narrow pointed petals. The same writer (presumably) in a subsequent number of the same periodical says:—"Under these three names [*Nymphæa Zanzibarensis flore-rubro*, *N. Ortigiesiana* var. *Adele*, and *N. scutifolia rosea*] there are three plants in the collection at Kew, which are in flower and which are not distinguishable from each other. The first-named came from Karlsruhe, reputedly as a cross between *N. Zanzibarensis* and *N. dentata*; the second came through seeds from Palermo; and the third was obtained from Glasgow. Whatever the origin of the plant which has somehow been named three times, it is certainly a variety of the well-known African species, *N. stellata*, and, so far as I can make it out, it is the form which has been named *N. stellata* var. *purpurea*. The flowers are five inches across, with purple filaments and yellow anthers; open before noon and remain expanded till evening."—W.W., Gardeners' Chronicle, June 30, 1888, ser. 3, III, p. 800.

11.—C. EDULIS, *Salisbury*, l.c. Rees's Cyc., VI. Britten, Jour. Bot., XXVI, p. 9. *Nymphæa Coteka*, Roxb. MSS. *N. edulis*, DC., Syst., II, p. 52; Prod., I, p. 52.

India.

12.—C. MAGNIFICA, *Salisbury*, Paradisus Londinensis, t. 14. Britten, Jour. Bot., XXVI, p. 9.

*Nymphæa rubra*, Roxb. MSS. (Salisbury), and Flora Indica, II, p. 576. Andrews' Bot. Repos., t. 503. Sims' Bot. Mag., t. 1280 (DC.) DC., Syst., II, p. 52. Prod., I, p. 115. Paxton's Flower Garden, p. 63, t. 50, where it is observed: "This brilliant aquatic, though an old inhabitant of our gardens, is still a rarity, appearing only in first class collections. Nor has it been fortunate in the artists who have attempted to fix its likeness on paper; the early figure in the Botanist's Repository is particularly unsatisfactory. . . It is probable that more species than one may be included in this name. . . The leaves are closely covered on the underside with a soft felt of delicate hairs, which are quite perceptible to the touch, . . . simple attenuated and smooth cones."

India, flowering in the rainy season.

13.—C. LOTUS. *C. mystica*, Britten, Jour. Bot., l.c. Salisb., Ann. Bot., II, p. 73 and Paradisus Lond., (in part).

*Nymphæa Lotus*, Linn., l.c. Delile, Fl. Ægypt. Ill. DC., Syst., II, p. 53. Prodr., I, p. 115. *N. cærulea*, Savigny, Decad. Ægypt.

Nile regions and N. Africa.

Varieties in cultivation, referred more or less correctly to this species, are: *rubra* (not *C. magnifica*); *dentata*, a white flowered variety which lacks the purple colouring of leaf; *Devoniensis*, with dark-red flowers, said to have been "raised at Chatsworth from *rubra*, and the type," by another writer to have been "produced from the white-flowered *dentata*"; also *sagittata*; *pubescens*; *Boucheana*, raised from same plants as *Devoniensis*; *Sturtevantii* ×, A. Gr., flower paler than in *Devoniensis*, from which it was raised by Mr. E. Sturtevant, "differs from the other red flowered Nymphæas viz., *rubra*, *Devoniensis*, and *Ortigiesiana*, in the form and color of its flowers, and the tint of its leaves," (The Garden, XXIII, p. 184. *Kewensis*, a hybrid of *C. Lotus fl. albis* by *Devoniensis*, is figured in the Botanical Magazine, t. 6988, (April, 1888).

14.—C. PUBESCENS, *Woody & Wood*, Rees's Cyclop., VI.

*Nymphæa pubescens*, Willd., l.c.

*N. Lotus*, Roxb. "Rep. 391."

*Castalia mystica*, Salisb., Ann. Bot. (in part).

*C. sacra*, Britten, Jour. Bot., XXVI, p. 10.

India.

15.—C. THERMALIS, Britten, Jour. Bot., XXVI, p. 10.

*Nymphæa Lotus*, Waldst. et Kit., Pl. Par. Hung., I, p. 13, t. 15.

*Cast. mystica*, Salisb., Ann. Bot., II, p. 73, and Paradisus, (in part). *Nymphæa thermalis*, DC., Syst., II, p. 54. Prod., p. 115.

Hungary.

This and the two preceding species, *pubescens* and *Lotus*, have been much confused, and there is uncertainty in the references to authorities. This is said to have always large white sweet-scented flowers, and to be distinguished from the large forms of *Lotus*, (under which name it is figured in Bot. Mag. and Bot. Rep.) by absence of pubescence on the lower surface of the leaves, and the "large depression in the crown of the germen."

16.—C. BLANDA. *Nymphæa blanda*, Meyer, Prim. Fl. Essequib., p. 201, (DC.) DC., Syst., II, p. 59. Hook., Bot. Mag., t. 4823, (*Amazonum*).

*N. Amazonum*, Mart. & Zucc. Planchon, Ann., des Sc. Nat., ser. 3, XIX, p. 48.

*N. Rudgeana*, Meyer. Grisebach, Fl. Brit. West Indian Islands, p. 11.

Plants in cultivation under names of *Nymphæa Rudgeana* and *N. Amazonica* are apparently referable to this species.

Brazil. Guiana.

The following species having been mostly described from dried specimens in Herbaria, or being still imperfectly known, it is not desirable to rename them under the genus *Castalia* without further investigation :—

*Nymphæa Berneriana*, Planchon. Annales des Sciences Naturelles, ser. 3, XIX, p. 39. Madagascar.

*N. Emirnensis*, Planch., Ibid. Madagascar.

*N. Guinensis*, Thonn. et Schum. Walpers' Rep., I, p. 107. Guinea.

*N. Hudelotii*, Planch., Ibid. *N. pseudopygmæa*, Lehmann, Ann. Sc. Nat., ser. 4, I, p. 327. Senegambia.

*N. abbreviata*, Planch., Ann. Sc. Nat., ser. 3, XIX, p. 42. Senegambia.

*N. Gardneriana*, Planch., Ibid. Brazil.

*N. oxypetala*, Planch., Ann. Sc. Nat., l.c., p. 51. *N. Raja*, Lehmann, Ann. Sc. Nat., ser. 4, I, p. 327. Guayaquil.

*N. Jamesoniana*, Planch., Ann. Sc. Nat., ser. 3, XIX, p. 51. *N. sagittariaefolia*, Lehm., Ann. Sc. Nat. ser. 4, I, p. 327. Guayaquil.

*N. gracilis*, Zuccarini. Walp. Rep. I, p. 107.

*N. Mexicana*, Zucc. Walp. Rep., I, p. 108.

*N. Fenzeliana*, Lehm. Ann. Sc. Nat., ser. 4, I, p. 327. Guiana.

*N. Goudotiana*, Planch., l.c., p. 49.

*N. lasiophylla*, Mert. & Zucc. Planch., Ann. Sc. Nat., l.c., p. 50.

*N. tussilagifolia*, Lehm., l.c., p. 326. Walpers Annales, IV, 162. Mexico and the Amazon.

*N. pulchella*, DC., Syst., II, p. 51; Prod. I, p. 115. Peru.

Two fossil forms have been referred to this genus, and may also be left without Castalian names :—

*Nymphæa Dumasii*, Saporta, Comptes Rendus, tom. CIV, No. 22.

*N. polyrhiza*, Sap., found in the tertiary strata of the south-east of France, by Gaston de Saporta. Annales des Sc. Nat., ser. 4, XIX.

#### GENUS V.—NYMPHÆA, *Salisbury*, (*Linn.* in part.)

Salisbury, Ann. Bot., II, p. 71. *Nuphar*, Smith, Fl. Græc., I, p. 361, etc. Benth. & Hook., Gen. Pl., l.c.

## List of Species:—

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|--------------------------|-----------------------------|
| 1. <i>N. lutea</i> .     | 5. <i>N. microphylla</i> .  |
| 2. <i>N. advena</i> .    | 6. <i>N. polysepala</i> .   |
| 3. <i>N. Fletcheri</i> × | 7. <i>N. sagittifolia</i> . |
| 4. <i>N. pumila</i> .    | 8. <i>N. Japonica</i> .     |

1.—*NYMPHÆA LUTEA*, *Linn.*, *Species Plantarum*, ed. 2, p. 729, in part, (exclude the Canada plant of Kalm.) *Willd.*, *Sp. Pl.*, II, p. 1151, and European botanists. *Britten*, *Jour. Bot.*, XXVI, p. 8.

*Nuphar luteum*, *Smith*, *Prod. Fl. Gr.*, I, p. 361.<sup>1</sup> *Rees's Cyc.*, XXV., *Koch*, *Synops. Floræ Germanicæ et Helveticæ* (1843), and of other European botanists. *Lawson*, *Water Lilies*, p. 97.

*Nymphæa umbilicalis*, *Salisb.*, *Ann. Bot.* II, p. 71.

The Common Yellow Water Lily of Europe.

2.—*N. ADVENA*, *Solander*, *Aiton's Hortus Kewensis*, ed. 1, II, p. 226, (1789). *Michaux*, *Flora Boreali-Americana*, I, p. 311. *Britten*, *Jour. Bot.*, XXVI, p. 9.

*Nuphar advena*, *R. Brown*, in *Ait. Hort. Kew.*, ed. 2, III, p. 295, (1811.) *DC.*, *Syst.*, II, p. 63, with full synonymy (the numbers referring to *Rees's Cyclopædia*, as given in *DeCandolle's Systema* are the numbers of the consecutive species of *Nuphar* described in the work, and do not indicate either pages or volumes; the *Cyclopædia* is not paged.) *Watson*, *Bibl. Index*, p. 37. *Macoun*, *Cat. Can. Pts.*, pp. 32 and 484. *Nuphar Americanum*, *Provancher*, *Fl. Can.*, p. 28.

*Nymphæa arifolia*, *Salisbury*, *Ann. Bot.*, II, p. 71.

The Common Yellow Water Lily of America. Introduced to English gardens in 1772 by Mr. William Young.

*Nuphar variegatum*, *Engelmann*, is referred by *Gray* as a variety of this species.

*DeCandolle* and *Salisbury* both quote, as belonging to this species, the *Nymphæa floribus flavis* of *Clayton*, in the *Flora Virginica* of *Gronovius*, "ed 1, p. 164." I have not been able to refer to that edition, but find neither the name, nor any corresponding plant, in the second edition of 1762.

3.—*N. FLETCHERI* ×. *Nuphar advena* × *Kalmianum*, *Caspary*, MS. *Macoun*, *Cat. Can. Pl.*, p. 32, (1883). *Fletcher*, *Flora Ottawaensis*, p. 62 (exc. syn. *N. rubrodiscum*). Mr. *Fletcher* describes this hybrid, which he found in the Ottawa River, as intermediate in size and appearance between *Nuphar advena* and *Kalmianum*, the floating leaves purple beneath, with slender petioles, the submerged ones freely produced and like those of the latter species; expanse of flowers 1½ inches, sepals 6, stigmatic disc 10–15-rayed, the perfect fruit, which is seldom produced, bearing a closer resemblance to that of *Kalmianum* than of the other parent. Prof. *Caspary*, to whom living plants were sent, found the

<sup>1</sup> The generic name *Nuphar*, a neuter noun, was long treated by *Smith*, *DeCandolle*, and European botanists generally, as feminine. In quoting references, I have not thought, it necessary or desirable to keep up the feminine terminations given by the authors quoted to the adjective terms. The change to the neuter gender appears in *Walpers' Annales*, tom. IV, fasc. 2, published in 1857, after which corrections of names come slowly into botanical works; the earliest instance of correct use that I can find is in *Koch's Synopsis Floræ Germanicæ et Helveticæ*, 2nd ed., published in 1843. His first edition, I have not been able to refer to.

pollen to be bad, as usual in hybrids, 95 per cent. of the grains being empty sacs without fovilla.

The denoting of hybrids by pedigrees of descent instead of names, as was Caspary's custom, is rather disturbing to a binomial system. I have, therefore, suggested a needed name. Mr. Thomas Morong has described, as *Nuphar rubrodiscum*, a Lake Champlain form which has sound pollen grains and fruits freely; he regards it as "a new and perfect species," developed from the hybrid, and synonymous with the *Nuphar luteum* of Gray's Manual, (Botanical Gazette, XI, p. 167. July, 1886.) This is *Nymphaea rubrodisca*, Greene, Bulletin Torrey Bot. Club, March, 1888, p. 84.

4.—N. PUMILA, *Hoffm.*, Deutschlands Flora, (1800), p. 241. (Smith). *N. lutea*  $\beta$  *minima*, Will., Sp. Pl., II, p. 1151. *Nuphar minimum*, Smith, E. Bot., t. 2292, (1811.) Rees's Cyc., XXV. *Nuphar pumilum*, Sm., Eng. Fl., III, p. 16. Lawson, Water Lilies, p. 101.

Mountain Lakes of Scotland and other parts of Northern Europe, rare.

5.—N. MICROPHYLLA, *Persoon*, Synops. Plantarum, II, p. 63, (1807). Britten, Jour. Bot., XXVI, p. 9.

*N. lutea*  $\beta$ . *Kalmiana*, Michaux, Fl. B. A., I, p. 311, (1803).

*N. Kalmiana*, Sims, Bot. Mag., t. 1243, (1809).

*Nuphar Kalmianum*, R. Br., Ait. Hort. Kew., ed. 2., III, p. 295, (1811). Smith, Rees's Cyc., XXV. DC., Syst., V, p. 61, (exc. syn. Walt. Fl. Car.) Pursh. Barton. Hooker. Gray. Wood.

*Nuph. luteum* var. *Kalminanum*, Torr. and Gray, Fl. I, p. 58.

*Nuph. luteum* var. *pumilum*, Gray, Manual, ed. 5, p. 57. Macoun, Cat. Can. Pl.

*Nymphaea lutea*, Linn., Sp. Pl., ed. 2, p. 729, in part, (the Canadian plant from Kalm). Canada and other parts of North America, not common.

6.—N. POLYSEPALA, *Greene*, Bulletin Torrey Bot. Club, March, 1888, p. 84.

*Nuphar polysepalum*, Engelm. in Trans. Acad. St. Louis, II, p. 282, (1865.) A. Gr., Proc. Am. Acad., VIII, p. 376. Macoun, Cat. Can. Pl., pp. 32 and 484. Porter, Fl. Colorado, p. 5.

This Western American plant is obviously nearly related to *Nuph. advena*, and when more carefully studied may come to be regarded as a variety of that species.

7.—N. SAGITTIFOLIA, *Walter*, Flora Carolina, p. 154, (1788).

*N. longifolia*, Michaux, Fl. B. A., I, p. 312, (1803).

*N. sagittifolia*, Salisbury, Ann. Bot. II, p. 71, (1805).

*N. sagittata*, Pers., Synop., (1807.)

*Nuphar sagittifolium*, Pursh., Fl. Am. Sep., II, p. 370 (1814.) Morong, Bot. Gaz., XI, p. 169.

*Nuphar longifolium*, Smith, Rees's Cyc., XXV.

This may probably be a southern form of *Nuph. advena*.

8.—N. JAPONICA.

*Nymphaea lutea*, Thunb., Fl. Jap., (exc. syn).

*Nuphar Japonicum*, DC., Syst., II, p. 62, Prod., I, p. 116.

Japan.

GENUS VI.—NELUMBO, *Tournefort*.

Tournefort, *Inst. Rei. Herb.*, p. 261. Adanson, *Familles des Plantes*, II, p. 76. Gært. Poir. Lamarck. Persoon, *Synops. Pl.*, II, p. 92. Greene, l.c. *Nymphæa*, Linn., in part. *Nelumbium*, Jussieu, *Gen. Pl.*, p. 76, (1790). Benth. & Hook., I, p. 47. *Cyamus*, Smith, *Exotic Botany*, (1804). Salisb. *Ann. Bot.*, l.c., (1805.) Bentham & Hooker recognised two species.

## List of Species :—

1. *N. speciosa*.

|

2. *N. lutea*.1.—*N. SPECIOSA*.

*Nelumbium speciosum*, Willd., *Sp. Pl.*, II, p. 1258. *Bot. Mag.*, t. 903.

*Nymphæa Nelumbo*, Linn., *Sp. Pl.*

*Cyamus Nelumbo*, Smith, *Exot. Bot.*, I, p. 59, t. 31, 32.

*C. mysticus*, Salisbury, *Ann. Bot.*, II, p. 75.

*Nelumbo Indica*, Persoon, l.c.

India, Ceylon, Java, China, Egypt, &c.

2.—*N. LUTEA*, Persoon, l.c., (1807) “Baillon, *Hist. Pl.* III, p. 79, (1872).” Greene, *Torrey Bulletin*, Oct., 1887, p. 215.

*Nelumbium luteum*, Michaux, *Fl. B.-A.*, I, p. 317. Willd., *Sp. Pl.*, l.c. Grisebach, *Fl. W. I.*, p. 12.

*Cyamus flavicomus*, Salisbury, *Ann. Bot.*, l.c.

*Nymphæa Nelumbo* var.  $\beta$ ., Linn., *Sp. Pl.*, l.c.

Jamaica, Carolina, Florida etc., extending north to the southern side of Cape Cod, its most easterly point, and to Lake Ontario in the west.

Smith remarks, in Rees's *Cyclopædia*, in reference to the name *Nelumbo*; “The name given by the natives of Ceylon to the sacred bean of India. Adanson, who first, with unquestionable propriety, separated this plant from *Nymphæa*, having no objection to barbarous names, retained *Nelumbo* for a generic appellation, and he is followed by Gærtner. It is not easy to say why they preferred a very confined and local appellation, for a plant known throughout India by the name of *Tamara*, by which it is distinguished in the *Hortus Malabaricus*, and celebrated in Hindoo poetry and mythology. Jussieu intended as an improvement the alteration into *Nelumbium*. We wish to adhere, as much as possible, to the Linnæan rejection of barbarous generic names, and have no desire to establish either *Nelumbo* or *Tamarā*, greatly preferring *Cyamus*. It is much to be wished that botanists not totally illiterate and tasteless, would advert a little to the propriety of keeping their nomenclature under some regulations of sense and uniformity, which those who read the writings of Linnæus, will find already established, and abundantly supported by reason and convenience.” Smith and Salisbury adopted the generic term *Cyamus*, which was also used by Pursh and Nuttall; but in Persoon's *Synopsis*, pars secunda, published two years later than Salisbury's paper, (1807), the original name of Tournefort was reverted to, and in its original form, *Nelumbo*; it had been so retained earlier in Lamarck's *Dictionary*, Vol. IV, published six years after Jussieu's proposed modification

in *Genera Plantarum*. In the *Systema* (1821), A. P. DeCandolle set aside *Cyamus*, because Latreille had occupied that name for a genus of Crustaceans, and adopted Jussieu's *Nelumbium*, which has been in general use since then, until Baillon again revived *Nelumbo*, (1872), which was enforced by Greene, and acquiesced in by Asa Gray.

GENUS VII.—BRASENIA, *Schreber*.

"Schreb. Gen. Pl., 372." (1789.) Benth. & Hook., Gen. Pl., p. 46.

BRASENIA PELTATA, *Pursh*, Fl. Am. Sept., p. 389. • Wats., Bibl., Index, p. 36.

1784. *Menyanthes nymphoides*, Thunb., Fl. Jap., p. 82.

*M. peltata*, Thunb., "Act. Upsalensis, VII, p. 142, t. 14, f. 2."

1803. *Hydropeltis purpurea*, Michaux, Fl. B.-A., p. 323, t. 29.

1805. *H. pulla*, Salisb., Ann. Bot., II, p. 74.

1813. *Brasenia Hydropeltis*, Muhlenberg, Cat., 55.

1814. *B. peltata*, Pursh, Fl. Am. Sept., p. 389.

1819. *Villarsia peltata*, Rœm. et. Schultes, Syst., IV, p. 178.

1821. *Hydropeltis purpurea*, DC., Syst., II, p. 37.

1845. *Limnanthemum peltatum*, Griesb., DC. Prod., IX, p. 141.

*Brasenia nymphoides*, "Baillon, Hist. Pl., III, p. 82."

This exceptionally curious plant, was first found in "Upper Canada" by F. Masson at the beginning of the century, but is now known to be widely distributed in our Canadian waters, and throughout those of North America generally, as well as in Eastern Asia and Australia. It has had a chequered literary career. The first term applied to it was not an inappropriate beginning: *Anonyma* of Plukenet's *Almagestum*, (DC., Syst.) In *Flora Japonica*, Thunberg named it by mistake *Menyanthes nymphoides*, supposing it to be the plant so named in the *Species Plantarum*, which, is now known as *Limnanthemum peltatum*, S. P. Gmelin, belongs to the *Gentianaceae*, and is not an American plant. In *Nova Acta Upsalensis*, Thunberg gave it another specific name, *peltata*, but still kept it in the same genus. Michaux (1803) described and figured it as *Hydropeltis purpurea*. Salisbury (1805) retained the generic name of Michaux, but, as was his wont, changed the specific term, calling the plant *H. pulla*. Muhlenberg (1813) adopted the generic name of Schreber, and used Michaux's generic as a specific term. The plant thus became *Brasenia Hydropeltis*. Pursh (1814) followed Schreber and Muhlenberg in the generic term, and brought back one of Thunberg's specific names, calling it *C. peltata*. Rœmer & Schultes (1819) returned it, probably in course of literary editing, and not from examination of the plant, to the Gentianaceous genus, naming it *Villarsia peltata*, (the plant with which Thunberg first confounded it having meantime become *Villarsia nymphoides*). DeCandolle (1821) restored the name of Michaux, *Hydropeltis purpurea*. Grisebach (1845), in DeCandolle's *Prodromus*, inserts, among his "species minus notæ," *Limnanthemum peltatum*,—"in Japoniâ," giving as synonyms *Meny. peltata et nymphoides*, Thunb. Finally, Baillon (Hist. Pl., III, p. 82), adopts the first mistaken



name, calling the plant *Brasenia nymphoides*. This is certainly the "priority" name, as is confirmed by Planchon, "fide specim. ex herb. Lugd. Batav. in herb. Mus. Paris., —non Linn." But *nymphoides* as a specific term surely belongs to the *Villarsia*, and, as an old generic name of Tournefort (although not now usually spelt with a capital *N*), and even for no other reason than to avoid further confusion, may well be restricted to its own genus, which has also had at least four other names in addition to *Villarsia*. The first correctly applied specific term for our plant is *peltata*. The generic name *Brasenia* goes back to 1789. In Rees's Cyclopædia, Sir James Smith remarks that Dr. Solander had made a genus of the plant, *Ixodia*, but the name of Michaux, *Hydropeltis*, having been printed, was properly retained by Dr. Sims. The generic name *Ixodia* was afterwards given by R. Brown to a New Holland composite plant.

Mr. Joseph Schrenk has published, in the Torrey Bulletin, (XV, pp. 29–47, Pls. 57 and 58) the results of a very careful and elaborate study of the vegetative organs of this plant, with precise and clear descriptions and drawings, to which I would invite the attention of students as a model that may be imitated with advantage in like investigations.

#### GENUS VIII.—CABOMBA, *Aublet*.

*Cabomba*. "Aubl. Pl. Guian." Benth. & Hook., Genera Plantarum, I, p. 46.

*C. CAROLINIANA*, Gray. Wats., Bibl. Index, p. 36, (with synonymy). *C. aquatica*, DC., Syst. Nat., I, p. 36.

Southern States of North America and Central America.

## REFERENCE LIST

OF

## SPECIES INCLUDED IN THE SYNOPSIS OF NYMPHÆACEÆ.

The names of the Species and of the principal Varieties are printed in this list in SMALL CAPITALS; synonyms and historical names in lower case letters.

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Fig. 1.

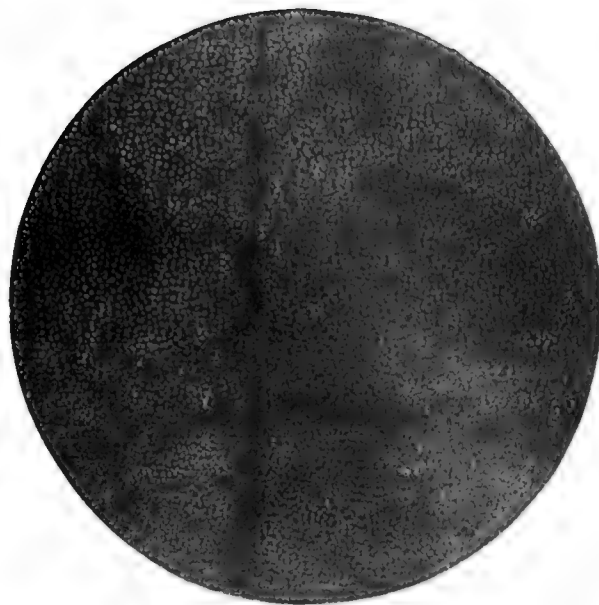


Fig. 2.

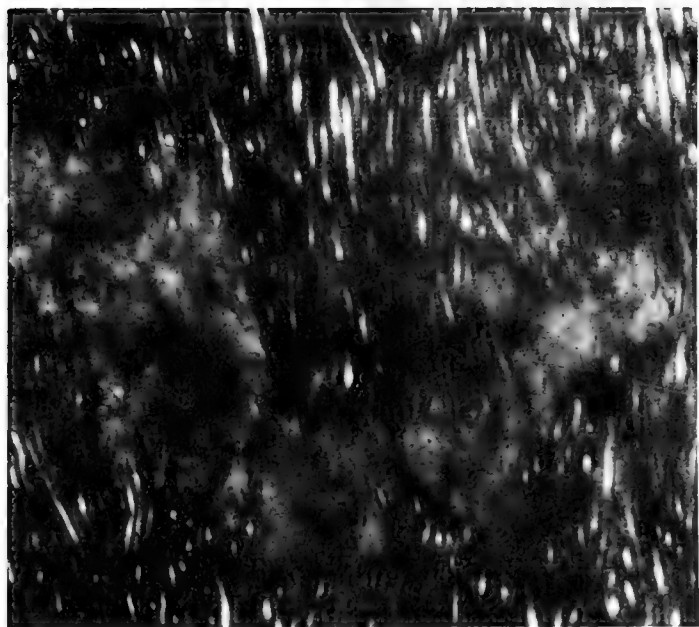


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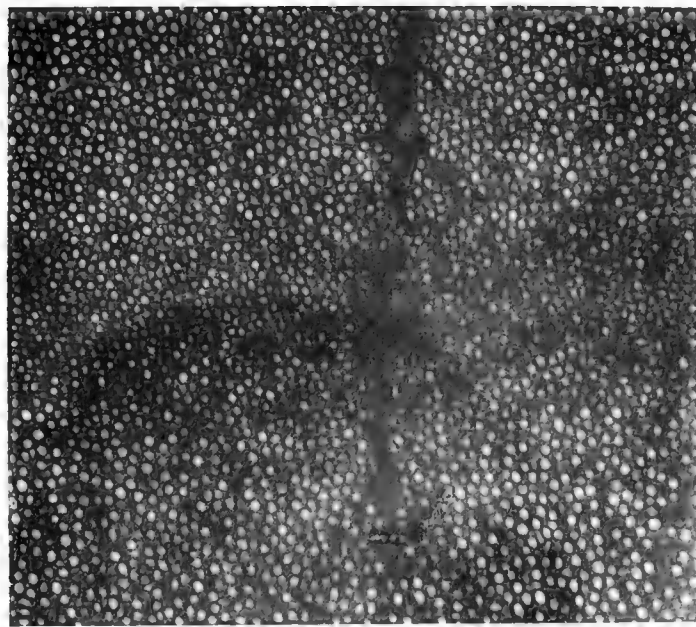


Fig. 4.

HEMATOPHYLLIN, GANTH





Fig. 5.

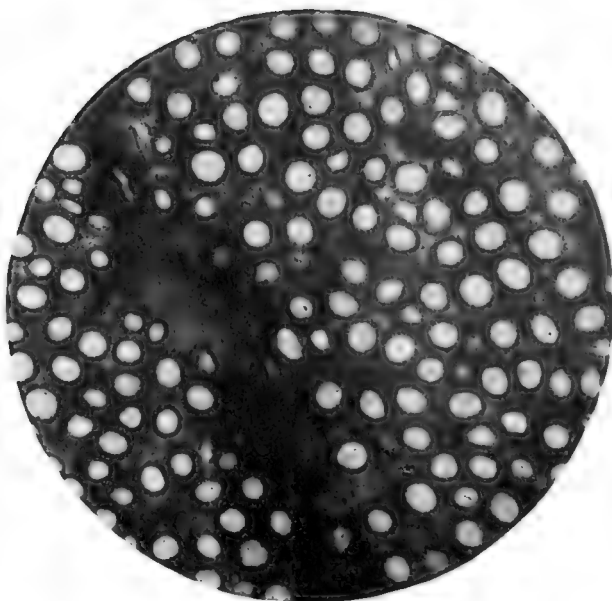


Fig. 6.

NEMATOPHYTON LOGANI, Dn.

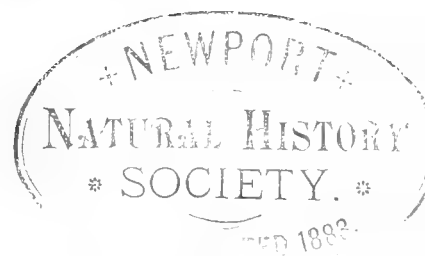


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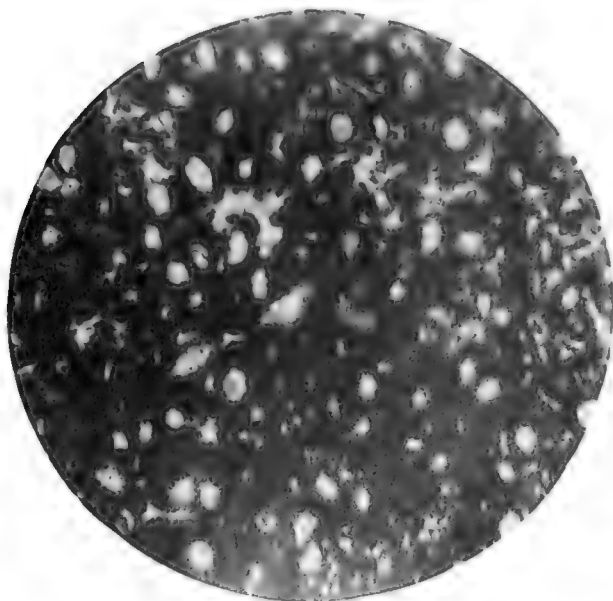
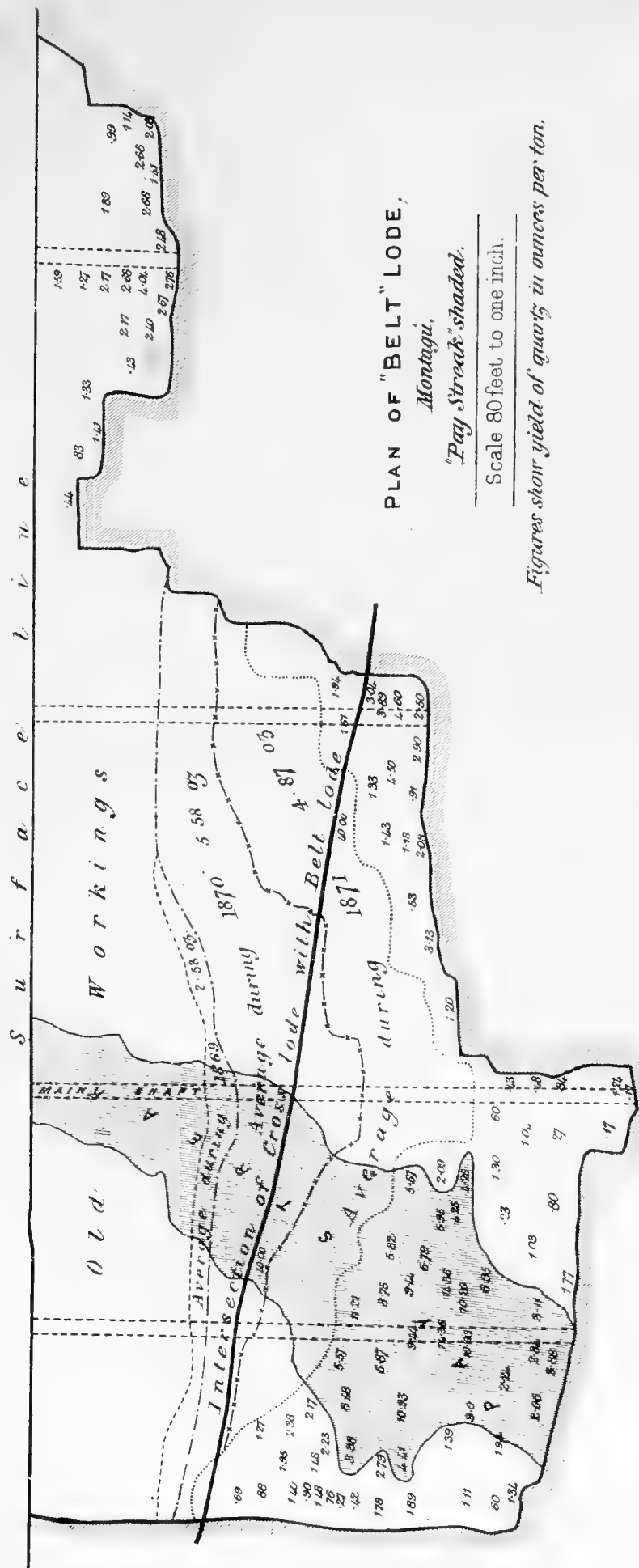


Fig. 8.

NEMATOPHYTON LAEVIS, Pet.







To illustrate Mr. E. Gilpin's Notes on Nova Scotia Gold Veins.



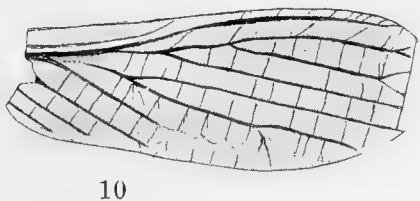
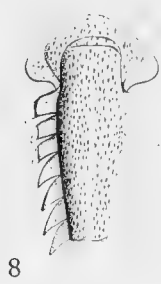
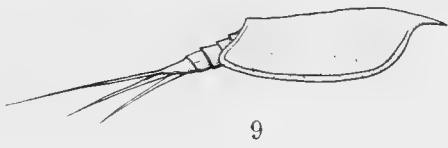
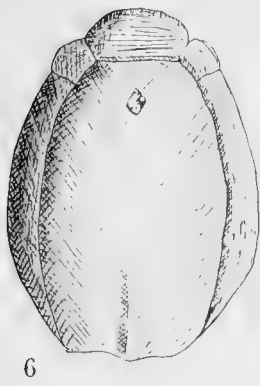
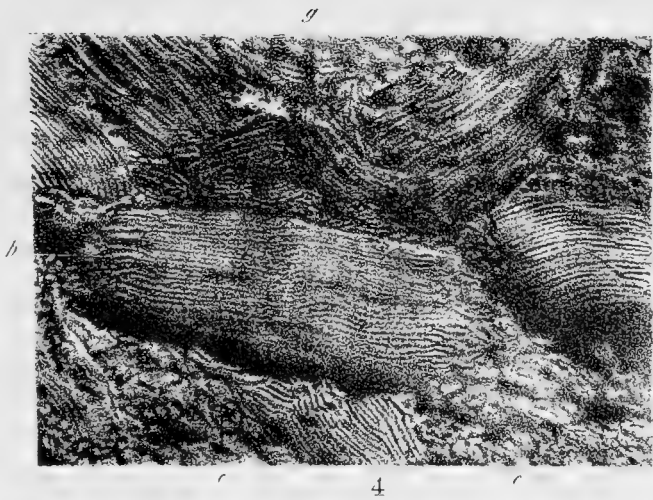
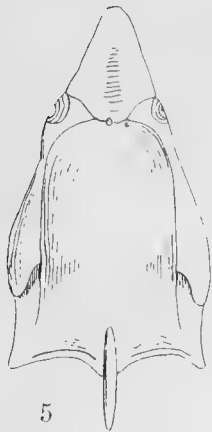
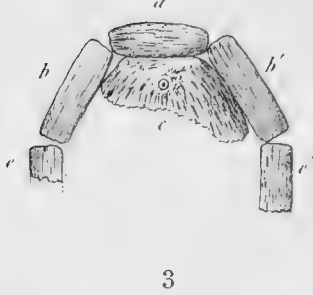
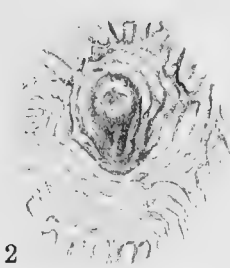
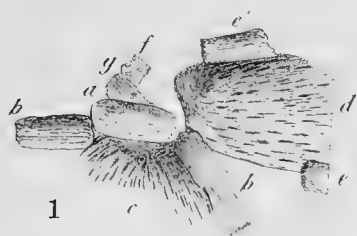
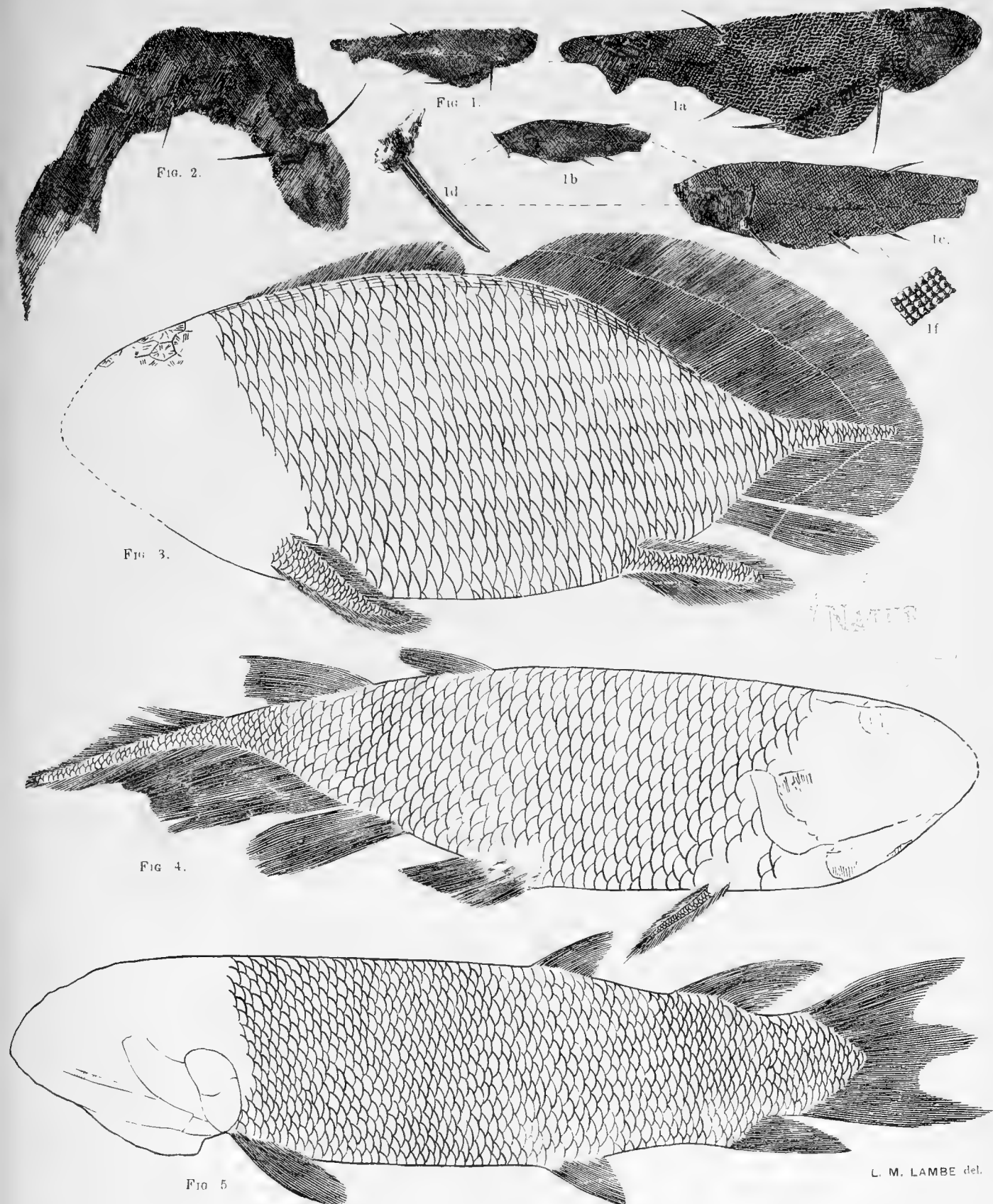


FIG. 1. A. G. M. M.

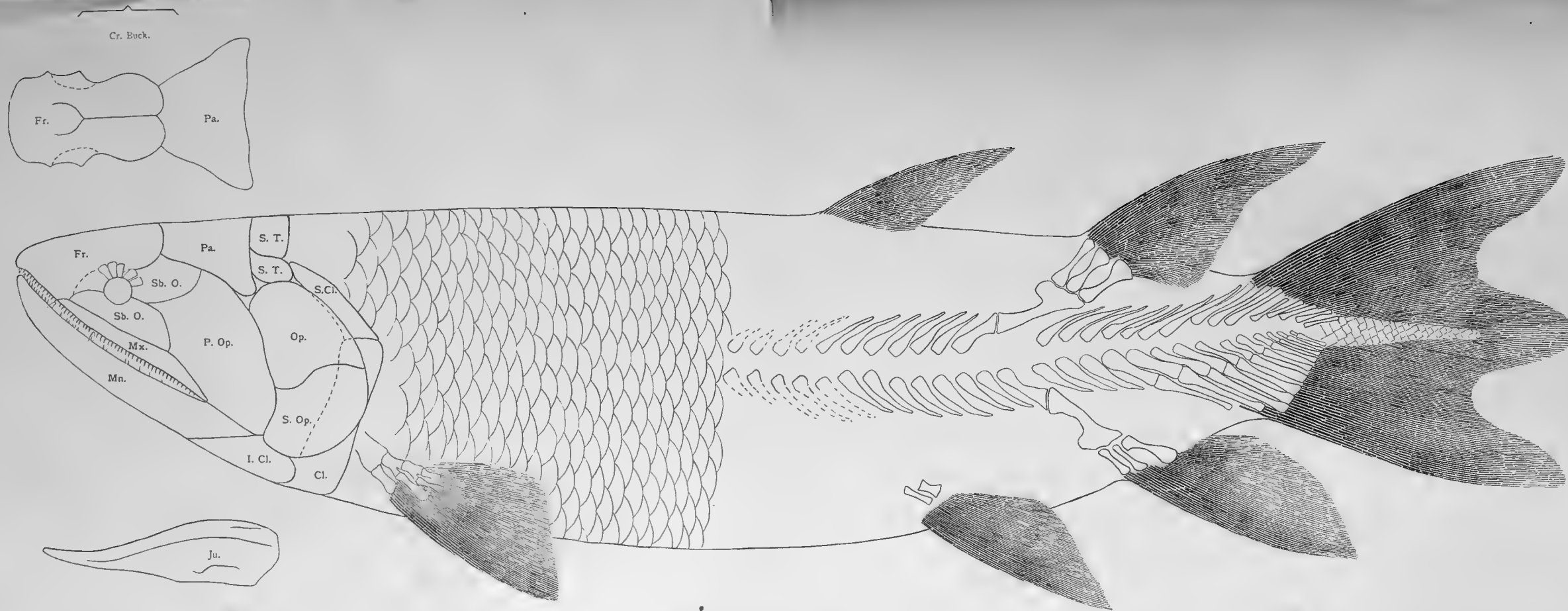
To illustrate Mr. G. F. Matthew's paper on Organisms of the Silurian and Devonian Rocks in Southern New Brunswick.





Figs. 1, 1a.—1f.—*ACANTHODES AFFINIS*.— 1, The most perfect specimen collected, natural size. (1a). The same enlarged. (1b). Another specimen. (1c). The same enlarged. (1d). Fin spine of ditto, enlarged. (1f). Scales of ditto, also enlarged. Fig. 2 —*ACANTHODES CONCINNUS*.—Specimen with the head preserved. Fig. 3.—*PHANEROPLEURON CURTUM*.— Slightly restored. Fig. 4.—*GLYPTOLEPIS QUEBECENSIS*.—The type of the species. Fig. 5.—*EUSTHENOPTERON FOORDI*.—A very young but unusually perfect specimen. All of natural size except 1 a, 1 c, 1 d, & 1 f.



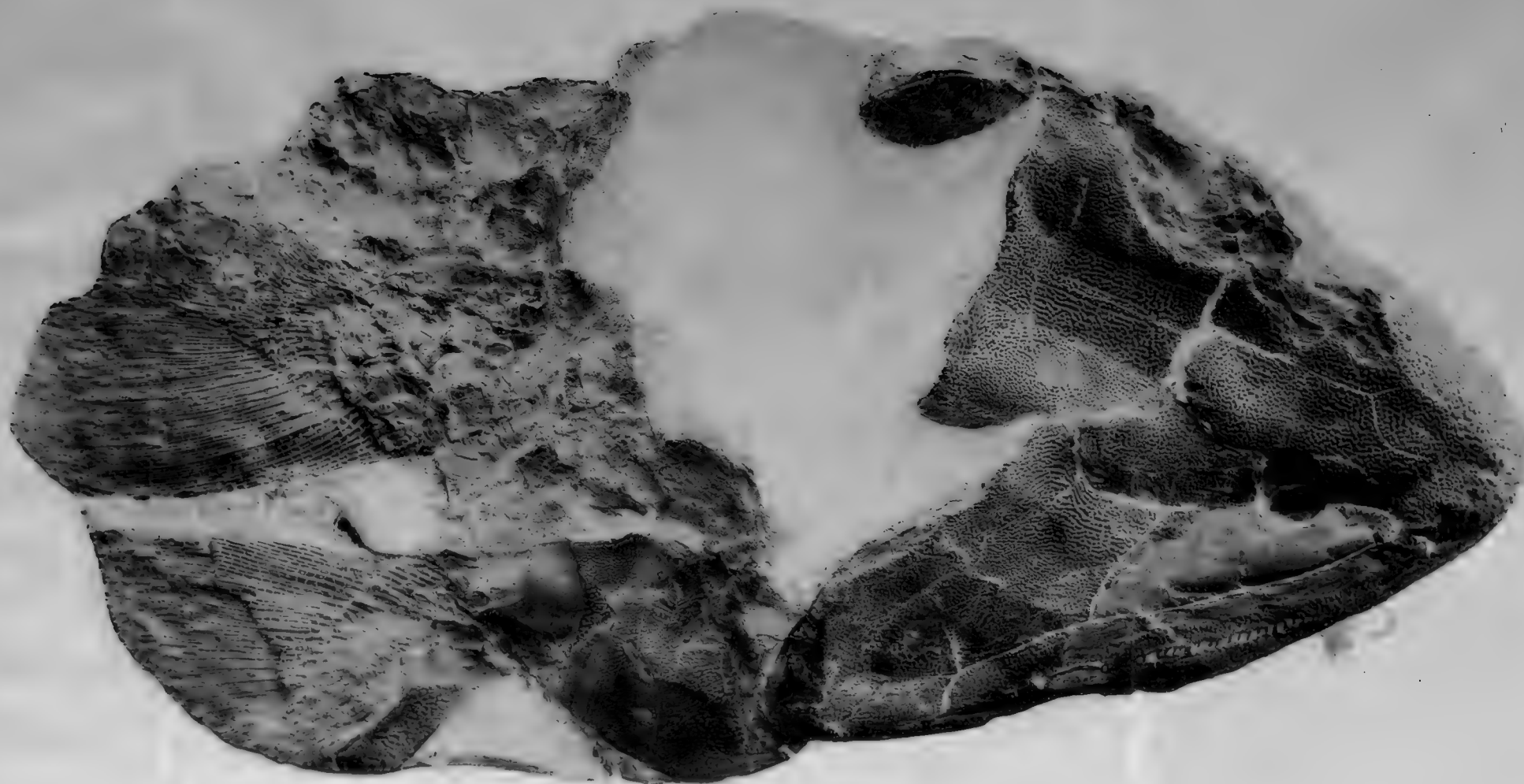


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EUSTHENOPTERON FORDOI, Whiteaves — Half-grown specimen; natural size and slightly restored.







EUSTHENOPTERON FOORDI, Whitesavv.

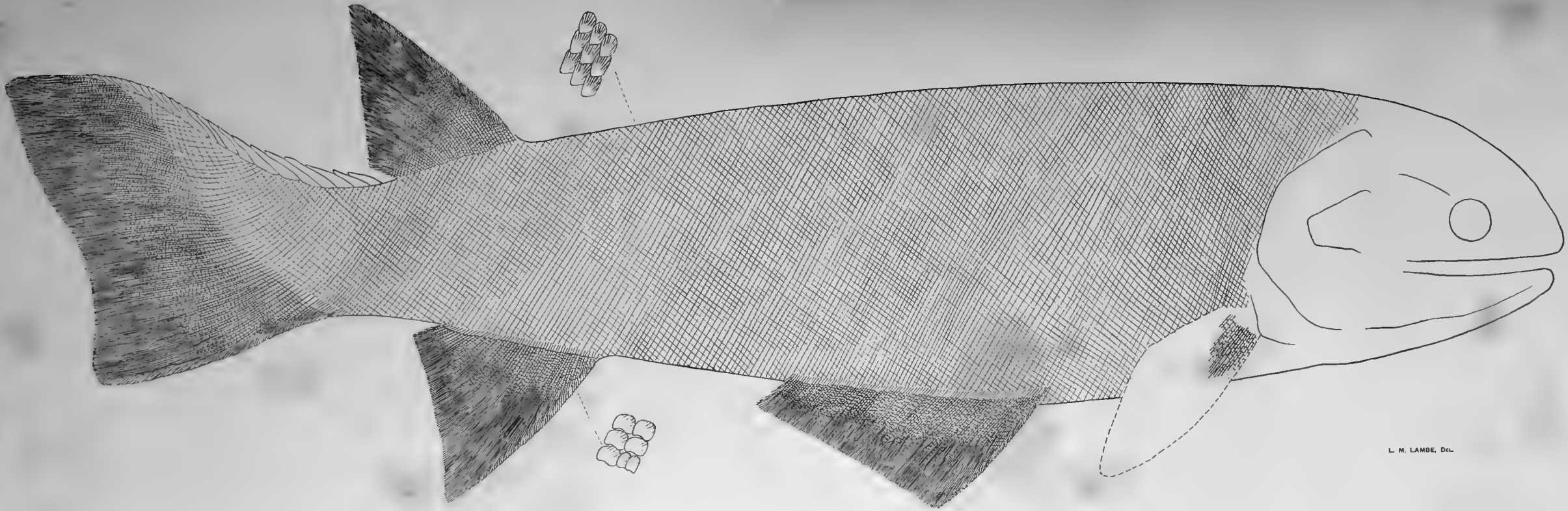
Head and pectorals of an adult specimen, natural size.



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CHEIROLEPIS CANADENSIS, Whiteaves — Natural size.





4. Ventromedian (?) plate.



3. Left Preventrolateral plate.



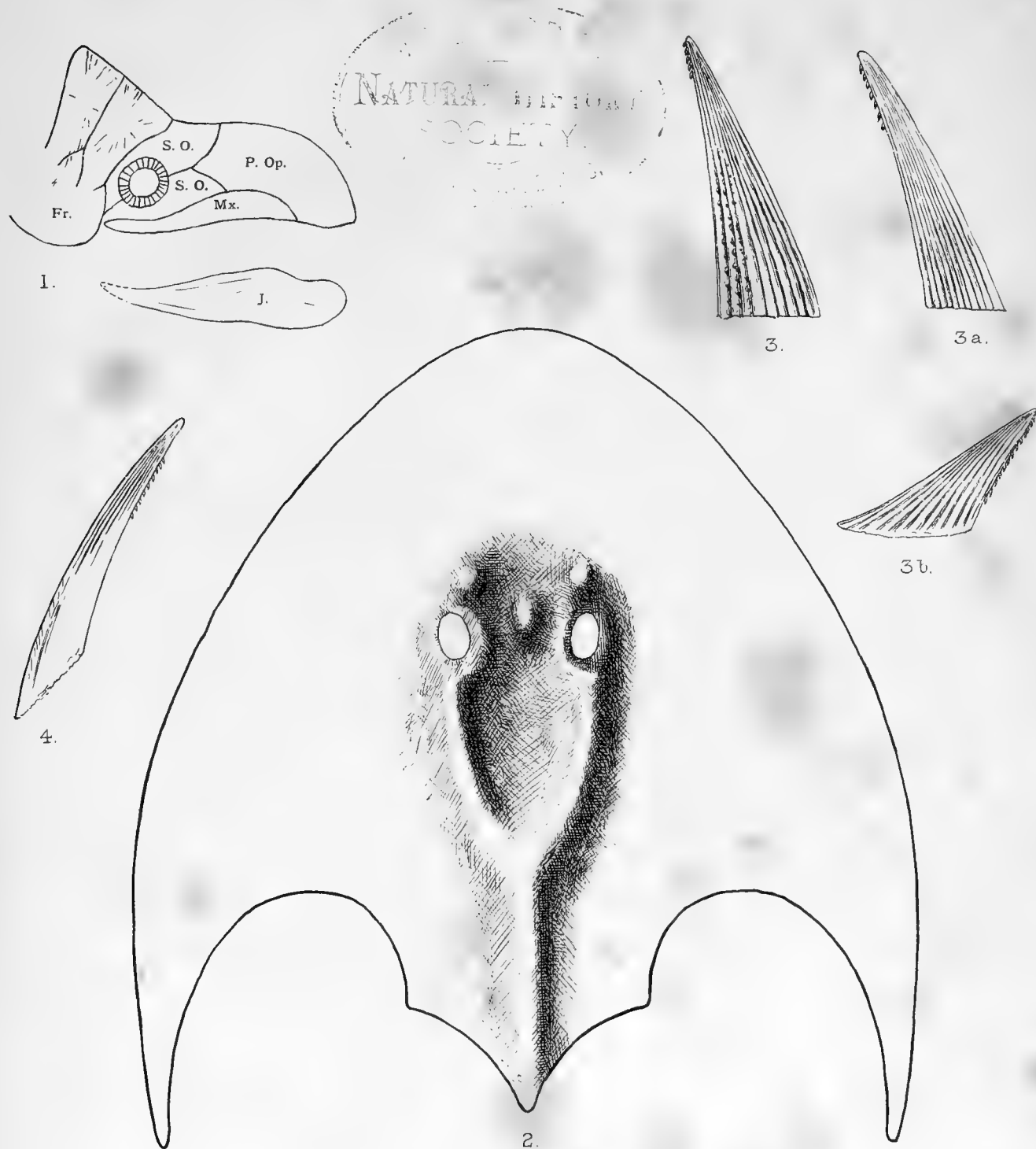
1. Cranial Buckler.



2. Post-dorsomedian plate.

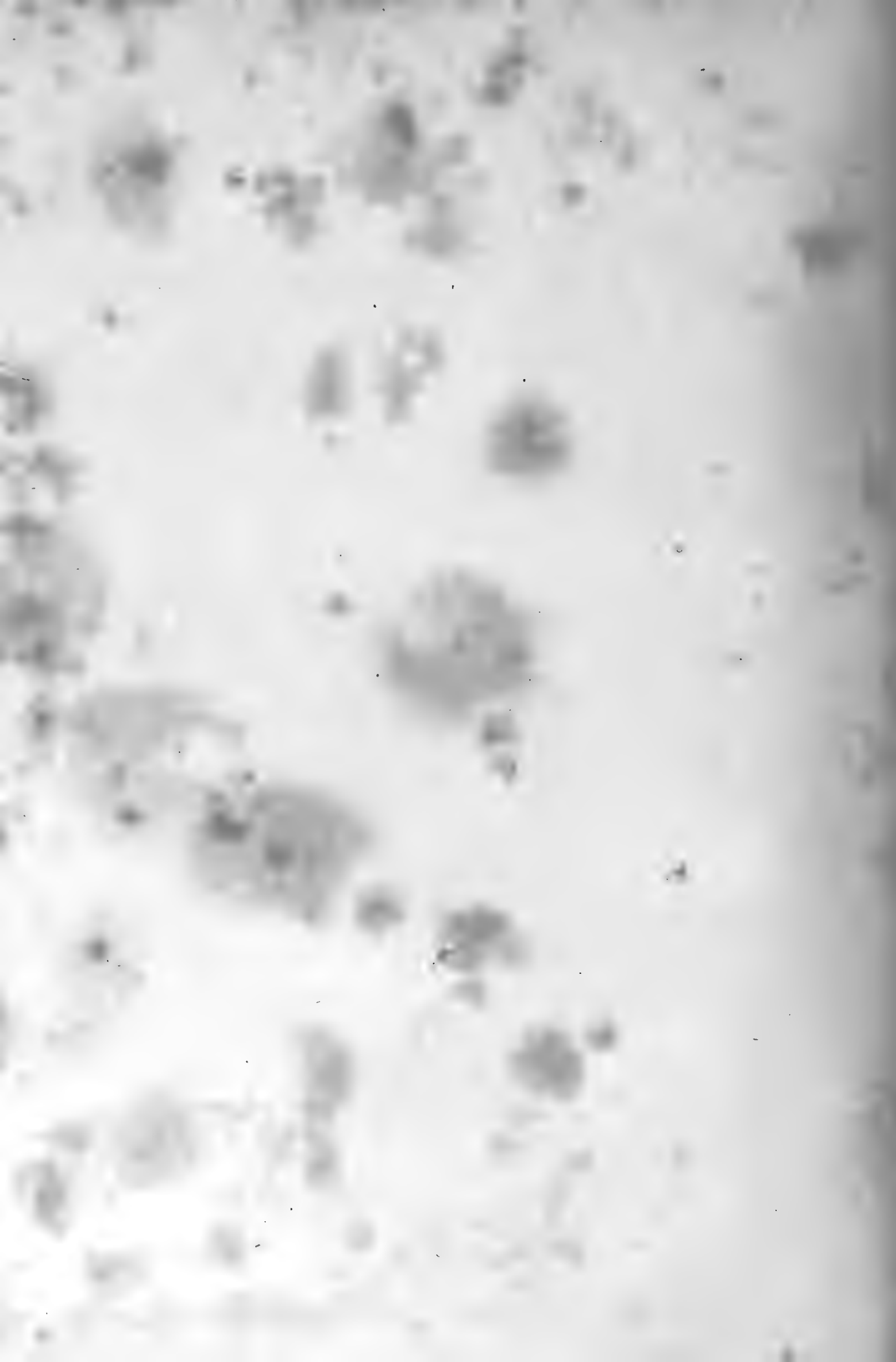
COCCOSTEUS ACADICUS. Whiteaves



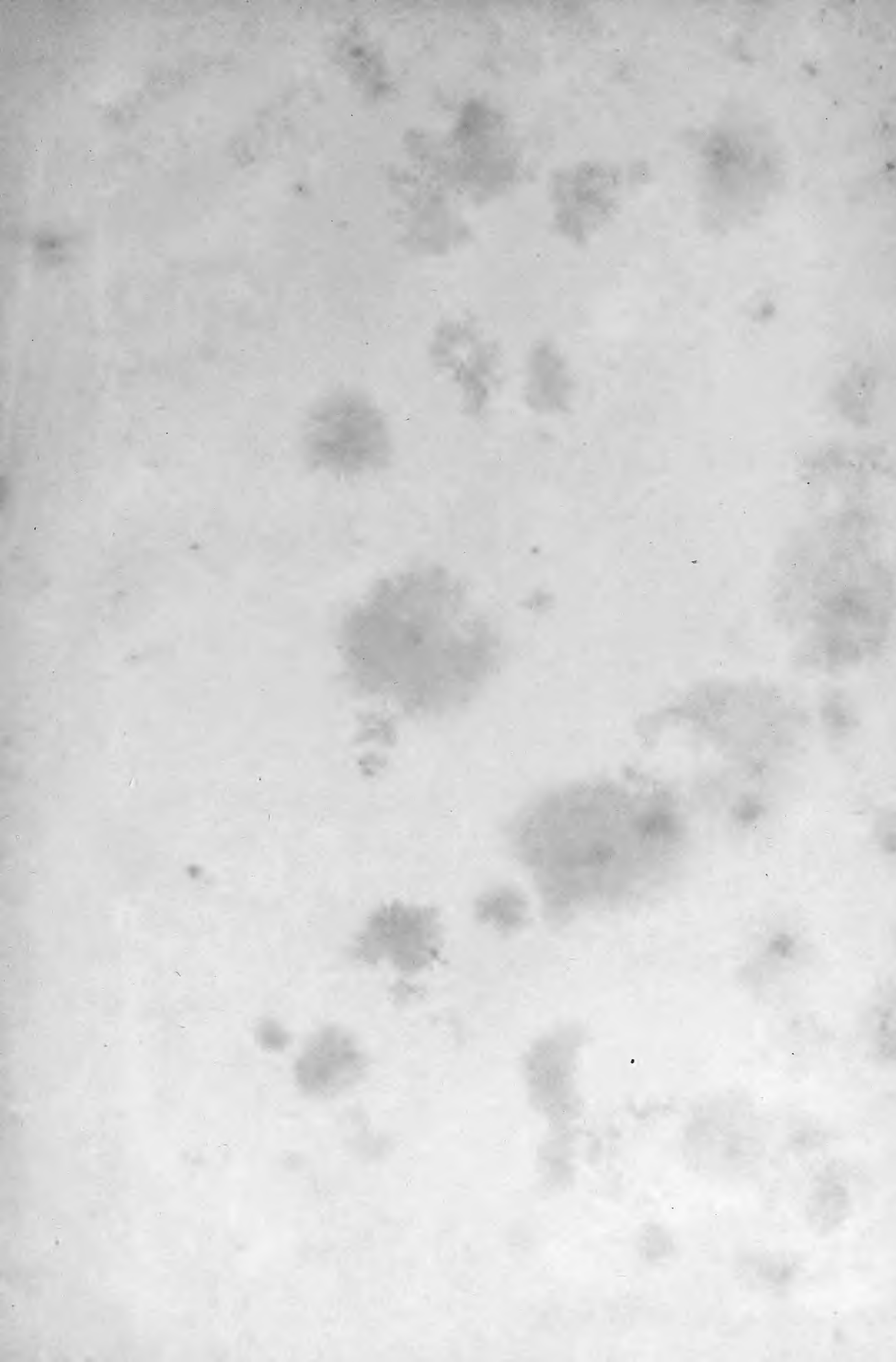


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- 1.—PHANEROPLEURON CURTUM.—Portion of head to show circumorbitals, &c.
- 2.—CEPHALASPIS CAMPRELLTONENSIS.—Cranial buckler of, slightly restored; nat. size.
- 3, 3a, and 3b.—CTENACANTHUS LATISPINOSUS.—Fin spine of; nat. size.
- 4.—HOMACANTHUS GRACILIS.—Fin spine of; nat. size.









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